

## CLASS 241, SOLID MATERIAL COMMINATION OR DISINTEGRATION

### SECTION I - CLASS DEFINITION

The main class definition is divided into the following sections:

General statement of class subject matter.

Chemical compounds, compositions, foods and beverages.

Suspensions and colloids

Coating or shaping of material

Fibrous and laminated material

Heating, cooling, or drying material

Operators for comminutors

Separation of material

Material handling, excavating, distributing, harvesting

Grain, flour and starch

Comminutor, or comminutor element, supports and mounting means

### GENERAL STATEMENT OF CLASS SUBJECT MATTER

A. This is the generic class for (1) the comminution and disintegration of solid material, and (2) the comminution and disintegration of solids combined with other treatment of the material where such combinations are not provided for in other classes and are not specifically excluded by the following notes and definitions.

B. As used in this classification, the terms “comminution” or “disintegration” necessarily include the following elements: (1) There must be a division of a solid mass into a number of smaller solid masses. (2) The treatment must include no operation which is directed toward imparting a desired shape to the initial solid mass or the resulting smaller solid masses.

The term “comminution” has been considered to be generic to all the terms ordinarily applied to the subject matter of this class (e.g., grinding, milling, disintegration, trituration, pulverization, etc.). Therefore, for the

sake of brevity, the term “comminution” alone has been used in the notes and definitions below to denote the treatment which forms the basis of this class.

C. This class is limited to the treatment of solid material i.e., material in a self-sustaining, more or less rigid state, capable of resisting deformation to a certain extent. However, materials which normally may be considered “plastic”, but which, in the course of the comminution, perform substantially as do normal solids, in that smaller nonshaped particles are formed from a larger mass, have been looked upon as being solids for purposes of this classification. (See COATING OR SHAPING OF MATERIAL below). Treatment of solids in fluid suspension is included. (See SUSPENSION AND COLLOIDS below).

D. This class provides for both processes and apparatus for carrying out the comminuting treatment but not products thereof. Since product claims were considered controlling, patents having such claims were classified in classes appropriate thereto, whether or not a claim to a comminuting process or apparatus was included.

E. Where a patent includes claims to a comminutor or a comminutor part and a method of making the comminutor or part, the claim to the article is deemed to be controlling and classification of the patent in Class 241 is proper, unless the article is provided for elsewhere.

### CHEMICAL COMPOUNDS, COMPOSITIONS, FOODS AND BEVERAGES

In general, the compound, compositions, and food classes are superior to this class as to the production, reclamation or recovery of the materials provided for in those classes, and see GRAIN, FLOUR AND STARCH, below, for a special statement on grain, flour and starch.

A. The compound, composition, food and beverages classes will take:

(1) All patents, any claim of which is directed to a product provided for in those classes.

(2) Processes in which any step effects a chemical change in, dissolves, or forms a stable colloidal dispersion of all, or part, of the material (except where an added comminuting aid is removed from the material by chemical reaction or dissolution).

(3) Processes involving the formation of a composition by combining distinct ingredients which are sufficiently identified as to form a basis of classification, whether

the process involves a chemical reaction or is merely physical (as by compounding by comminution, per se). However, where the larger mass, before comminution, is made up of a plurality of dissimilar materials, and following comminution and separation, the constituent parts of the same mass are recombined, or partly so, such processes were not considered to involve the formation of a composition and have been classified in class 241.

(B) This class (241) will take:

(1) Processes and apparatus having the sole function of comminuting solid material.

(2) Processes and apparatus in which a comminuting step or means is combined with a physical step or means which has the sole function of facilitating the comminution.

(3) Processes and apparatus in which a comminuting step or means is combined with such additional steps or means as have been provided for in this class, such as: (a) separation or classification of the material into grades or sizes, including the recombination of separated ingredients of a single starting material; (b) separation of fluids from the material involving no chemical change in the material, as by filtering or drying operations; (c) heating the material; (d) cooling the material; (e) separation of comminuting aids from the material, which operation may include dissolution or a chemical reaction; (f) apparatus combinations of a comminutor with means for applying a fluid to the material for any disclosed purpose, including performing or initiating a chemical reaction. See subclass 38.

#### SUSPENSION AND COLLOIDS

This class (241) provides for the generic subject matter of comminuting solid material in a fluid to form or improve a suspension. See subclasses 21 and 38+. For exceptions to this and for related subject matter, see the References to Other Classes referring to this section (Suspension and Colloids).

#### COATING OR SHAPING OF MATERIAL.

(A) This class (241) does not include the shaping or coating of material, per se, (see the general statement of class subject matter in the class definition), but does provide for coating or shaping steps or means in combination with comminuting processes or apparatus in the following instances:

(1) Where the shaping is followed by a comminution which destroys the shape, as distinguished from causing a large shaped mass to be made into a plurality of smaller masses which retain one of the original dimensions of the large mass (e.g., flaking, where a formed sheet is broken up into flakes which retain the original sheet thickness dimension).

(2) Where a comminuting operation on a heterogeneous mass or mixture of material results in the simultaneous formation of shaped masses of a portion only of the material and the comminution of the remainder (e.g., the metallic constituents of an ore are formed into balls simultaneously with the comminution of gangue).

(3) Where the shaping is for the sole purpose of facilitating the subsequent separation of the material into grades. See Class 209, Classifying, Separating, and Assorting Solids, subclass 7, for this type of treatment, per se.

(4) Where the coating treatment is for the sole purpose of facilitating the comminution.

(B) The material shaping classes provide for shaping or forming, per se, and shaping processes and apparatus combined with preliminary comminuting steps or means.

#### FIBROUS AND LAMINATED MATERIAL.

Class 241 provides for processes and apparatus for comminuting fibrous and laminated material, and other treatments combined with comminution when such combinations are not of the type specifically provided for in other classes. See the References to Other Classes section for specific references to this section.

#### HEATING, COOLING, OR DRYING MATERIAL.

Class 241 provides for process and apparatus combinations in which comminution is combined with heating and/or cooling steps or means. See subclasses 8, 15+, 23, 38+, 65+. It does not include such combinations when the temperature modification of the material effects a change in the chemical nature of the material (e.g., removing water of hydration, etc), except those apparatus combinations in which the temperature change is effected by means which applies a fluid to the material, which may have the disclosed function of carrying out a chemical reaction. See the pertinent chemical classes for such combinations as are excluded above.

In general, Class 241 is superior to the following classes, or such parts, thereof that relate to the heating, cooling, or drying of solid material and takes combinations of the subject matter there provided for with comminution, unless a specific exception is noted: Class 34, Class 62, Class 110, Class 126, Class 148, Class 219, Class 266, Class 373, Class 432. See References to Other Classes, below, for an explanation of the lines between these classes and Class 241.

#### OPERATORS FOR COMMINUTORS.

Class 241 provides for the combination of a comminutor with means to move the comminuting members thereof. Organizations, per se, for effecting the movement of comminuting members are classified in the pertinent machine element, motor, or power plant class if no significant combination with the comminutor or comminutor element is claimed. Claims which include in addition to the specific operator (1) the manner of supporting the comminuting element relative to other parts of the comminutor, (2) mention of a plurality of cooperating elements, or (3) structural characteristics of the element itself, are considered to be claims to a significant comminutor combination for classification in Class 241. Mere naming of the comminuting element or its type is not deemed as significant inclusion thereof in the combination. Operators, per se, for comminuting elements are found in the classes listed below unless specifically excluded and the line stated above applies to each. See the References to Other Classes, below, for class references to this section.

#### SEPARATION OF MATERIAL

Class 241 is superior to the material separation classes and, therefore, provides for a process or apparatus in which comminution is combined with a step or means to separate the material into classes according to the physical characteristics of its components, before, during, or after the comminuting operation. See subclasses 9+, 24.1+ and 68+, or if the separation involves applying a fluid to the material, subclasses 19, 20 and 38+. As noted in CHEMICAL COMPOUNDS, COMPOSITIONS, FOODS AND BEVERAGES of this class definition, comminuting processes which include the separation of a comminuting aid from the material by dissolution or a chemical reaction are included in Class 241. The separating classes to which the above stated general line applies are: Class 95, Class 96, Class 209, Class 210, and Class 494. See References to other Classes, below, for specific references to this section.

#### MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING.

In general, Class 241 provides for processes and apparatus in which comminution is combined with steps and means to move and handle the material prior to or subsequent to the comminuting operation. Means to feed material to the comminuting zone for treatment and to discharge it therefrom are classified in the various feeding and discharging subclasses in the class. Material handling combinations other than those limited to mere feeding to and discharging from the comminutor are classified in the subclasses 25 and 101.01+, unless more specifically provided for.

Certain types of material handling have, on the other hand, been considered so specialized that classes including such subject matter have been considered superior to Class 241. For a list of such classes and a statement of the line with each, see (B) of this section below.

(A) The following are examples of those classes which deal with types of material handling to which Class 241 has been considered superior in accordance with the above stated general line and any patent having claims to a significant combination of the type of material handling treated in these classes with a comminutor is properly classifiable in class 241: Class 141, Class 193, Class 198, Class 212, Class 221, Class 222, Class 312, Class 406, Class 414. See References to Other Classes, below.

(B) The following classes deal with special types of material handling or moving which are considered superior to Class 241 and patents claiming significant combinations of such handling with comminuting steps or means are classified with the particular type of handling involved: Class 37, Class 56, Class 171, Class 172, Class 175, Class 239, Class 299, Class 404. See References to Other Classes, below.

#### GRAIN, FLOUR AND STARCH

The comminution of cereal or other seeds or seed parts and combinations of other treatments of the type provided for in the class, to form flour or other grain products, are provided for in Class 241, and see the above section on COMPOSITIONS, COMPOUNDS, FOODS AND BEVERAGES in general. For related subject matter, see the References to Other Classes, belows referring to this section.

## COMMINUTOR OR COMMINUTOR ELEMENT SUPPORTS AND MOUNTING MEANS

Combinations of a comminutor and a support or mounting therefor are provided for in Class 241. Combinations including means to stationarily support the comminutor are in subclasses 46.014+ and 285.1. Other mounting means (e.g., vehicular) are treated as combinations for subclasses 101.01+. See this class (241), subclasses 291+ for comminutor element-shaft combinations. For comminutor mounting means, per se, see the References to Other Classes, belows referring to this section.

## SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

Class 15, Brushing, Scrubbing, and General Cleaning, provides for processes and apparatus for cleaning comminuting members by the operations there provided for. Class 241 takes the combination of a significantly claimed comminuting member with a cleaning means therefore but mere identification of the member cleaned as a type of comminuting member was not deemed significant and such patents were assigned on the basis of the cleaner. In this class (241), see subclasses 166+. For processes and apparatus for removing accretions from containers which may result in the comminution of a portion of the material, see subclasses 104.05+ in Class 15 and (2) Note to the definition of subclass 105.05.

Class 30, Cutlery, subclasses 136+ for hand manipulated scrapers which may act to retain the material for use and subclasses 164.5+ for hand manipulated ice picks and chippers. Ice crushers and shavers which are not hand manipulated relative to the material are provided for in Class 241.

Class 62 takes (1) processes in which comminution of a solid refrigerant medium (e.g., ice), is combined with a step of utilizing the medium in cooling a material or article, (2) apparatus in which means for comminuting a solid refrigerant is combined with means to utilize the refrigerant (e.g., ice car, ice cream freezer or other refrigerating receptacle), and (3) processes and apparatus in which steps or means for manufacturing a solid refrigerant are combined with steps or means for comminuting the material. Class 241 takes processes and apparatus for cooling the material undergoing treatment combined with comminution thereof.

Class 69, Leather Manufactures, is for processes and apparatus for treating leather not elsewhere provided

for. Class 241 includes leather comminution but excludes organizations in which only a portion of the hide is removed, such combinations being classified in Class 69.

Class 73, Measuring and Testing, provides for testing processes and apparatus including comminuting steps or means for operating on material to determine certain of its characteristics; e.g., subclasses 7+. Class 241 takes material treatment processes and apparatus which includes steps or means to test the material in combination with comminution.

Class 75, Specialized Metallurgical Processes, Compositions for Use Therein, Consolidated Metal Powder Metal Powder Compositions, and Loose Metal Particulate Mixtures, for miscellaneous metallurgical processes including comminution only in combination with treatment of a type not provided for in Class 241. Class 75 includes alloys disclosed for use in forming comminutor parts when claims to the alloy, per se, are included. Claims to a comminutor element formed of a specific alloy are not controlling over claims to the alloy, per se, and classification of patents having both types of claims in Class 75 is proper. See (2) Note to the definition of subclass 213 of Class 75.

Class 99, Foods and Beverages: Apparatus, appropriate subclasses and the notes thereto for the preservation and production of foods and beverages. Cooking, adding ingredients, and bleaching are examples of steps which so change the nature of the final food product as to cause classification in Class 99. Search subclasses 510+ for comminution in combination with liquid recovery and 537+ for apparatus separating one portion of food from another, similar to the apparatus of Class 241.

Class 100, Presses, takes (1) processes and apparatus for expressing which apply comminuting pressure to the material where there is provided means for separating the expressed liquid from the solid. The paths of flow of the expressed material may be provided by the pressure elements themselves, (2) processes and apparatus for expressing combined with steps or means for comminuting the material prior to the expressing operation, and (3) convertible apparatus adapted to function either as an expresser or a comminutor. Class 241 takes processes and apparatus for comminuting material combined with steps or means to apply an expressing operation on the material prior to the comminuting operation, see subclasses 2, 25 and 101.01+.

Class 110 takes (1) processes and apparatus in which a solid fuel burning step or means is combined with a step

or means for comminuting the fuel before burning, or the residue after burning, (2) processes and apparatus in which comminuting of a fuel is combined with a step or means for adding air or other gas subsequent to the comminuting zone for the disclosed purpose of supporting combustion of fuel in a burner (see particularly subclass 106), and (3) fuel burning apparatus or parts thereof which may act to comminute material as a secondary or incidental function thereof (e.g., grates). Class 241 takes comminution combined with steps or means for applying heat to the material from a significantly claimed burner.

Class 134, Cleaning and Liquid Contact With Solids, is the generic class for cleaning and/or applying liquids to solids. Processes including such steps in combination with comminuting steps are classified in Class 241. Mere agitation of particulate material in the presence of liquid to separate dirt or other impurities therefrom is not considered to be comminution. Such processes are classified in Class 134 or other appropriate class, depending on the line between those classes. Class 241 provides for the separation of adhering impurities from solids by comminution, as distinguished from mere agitation or tumbling, either with or without the application of a liquid to the material. See the definitions and Notes to the definitions of subclasses 16+ in Class 134.

Class 162, Paper Making and Fiber Liberation, provides for the combination of a chemical digestion and comminution. Class 241 provides for the comminution of fibrous materials even when in liquid suspension for the preparation of a paper pulp. For the purpose of determining a line between this class (241) and Class 162, hot water shall be considered to be a chemical agent classifiable in Class 162. The comminution of fibrous material in suspension, even when disclosed for the purpose of making a paper pulp is provided for in Class 241 where no chemical treatment is claimed.

Class 209, Classifying, Separating, and Assorting Solids, for a process and apparatus relating to the separation of solids into grades or classes. A screen or the like, which could operate as a mere separator, but is disclosed as being adapted to function as a comminuting element, is classified in Class 241. See particularly subclass 83. An agitator for facilitating the flow of material through a screen may incidentally effect the comminution or a portion of the material. Such a device is classified on the basis of its essential function and is found in Class 209 unless the agitator is modified to further the comminuting effect. The classification of a patent relating to the presentation of a mass of plastic material to a series of openings will depend upon the disclosed purpose of the

process or apparatus: if the purpose is to remove foreign particles from the material, classification is in Class 209; if to comminute into discrete particles, it is found in Class 241; if to form into a desired shape or shapes, it is in the proper shaping class, for which see the Coating or Shaping of Material section of this class (241).

Class 222, Dispensing, takes processes and apparatus for dispensing material. Mere agitators for loosening lumps within a holder are not considered comminutors for Class 241. Most of the patents classified in the feeding subclasses of Class 241 show dispensers as subcombinations of the comminutor-feeder combination and a number of patents which disclose such combinations but in which the claims are limited to the dispenser, per se, have been classified in the appropriate subclasses of Class 222.

Class 266, Metallurgical Apparatus, for apparatus for heat treating metal. Note that heat treatment to effect a chemical reaction is excluded from Class 241 and such combinations are classified in appropriate classes taking such subject matter, as Class 266.

Class 366, Agitating, takes (1) processes which, by disclosure, are limited to mixing or agitating the material, and (2) apparatus which, by disclosure, functions solely to mix or agitate the material. Class 241 takes processes and apparatus in which agitating steps or means are combined with comminuting steps or means, and apparatus which, by disclosure, will function to comminute the material even though a mixing function is also disclosed. As to apparatus, the following exception is made to the foregoing line: Where the apparatus is disclosed as treating particulate material even though in admixture with liquids (e.g., wet or dry clay, sand, etc.); and the apparatus is of the type in which a plurality of surfaces cooperate with each other to apply pressure to a layer of material there-between, it is properly classifiable in Class 241 whether or not the disclosure is limited to mere agitation and subcombinations of such apparatus are also included in Class 241.

Class 404, Road Structure, Process, or Apparatus, for in situ comminution of earth or road surfaces in combination with other road building means. Comminution, per se, of road or earth surface is classifiable in Class 241.

Class 417, Pumps, takes pumps including structural features which both facilitate the impelling of the fluid and produce incidental concurrent comminution of solids suspended in the fluid. Class 241 provides for (1) comminutors with means for pumping primary disclosed purpose of comminuting the material, but which may

have the additional incidental function of impelling the fluid.

Class 451, Abrading, takes (1) processes and apparatus in which the function of the claimed steps or means is disclosed as that of imparting a shape to or removing unwanted surface portions from an article by abrasion, and (2) processes and apparatus in which such an abrading step or means is combined with a prior comminution. Class 241, takes (1) abrading processes and apparatus, the disclosed purpose of which is to effect a comminution of the material (as defined in GENERAL STATEMENT OF CLASS SUBJECT MATTER of this class definition), and (2) processes and apparatus in which the comminution is combined with steps or means which act to impart a shape to or remove unwanted surface portions from the article or material prior to the comminution operation.

The following sections may also contain information relating to the lines between Class 241 and other classes.

### SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 2, 3, 32, 33, 34, 36, 38, 65, 67, 83, 97, 111, 169, 198.1, 200, 221, 227, 237, 244, 252, 270, 284, 293, and 296 for references to Class 100, Presses
- 5, 15+ and 38+, for fluid current conveying organizations and the corresponding processes and apparatus in combination with comminution.
- 15, for processes including such steps of cleaning and/or applying liquids to solids in combination with comminuting steps.
- 31, 39 and 59, for reference to Class 137, Fluid Handling.
- 32, 33, and 36, for reference to Class 192, Clutches and Power-Stop Control.
- 32.5, for reference to Class 200, Electricity: Circuit Makers and Breakers.
- 39, for reference to Class 239, Fluid Sprinkling, Spraying, and Diffusing.
- 59, for reference to Class 251, Valves and Valve Actuation.
- 65, 66, and 67, for reference to Class 165, Heat Exchange.
- 71, and see the line stated in the note to the definition of that subclass for reference to Class 116, Signals and Indicators.
- 99, for reference to Class 169, Fire Extinguishers.

- 100, for comminutors combined with means to fill a separable receiver.
- 101.01+, for the combination of a comminutor, significantly recited, and an electric signal therefor, also for reference to Class 340, Communications: Electrical, appropriate subclasses for electric signals, per se, for indicating a condition in a comminutor, particularly subclasses 500+ and 870.01+.
- 107, 111, 117, 123, 198.1, 205, 207, 227, and 237, for reference to Class 68, Textiles: Fluid Treating Apparatus.
- 169, 283, for references to Class 30
- 182, for reference to Class 220, Receptacles.
- 198.1, 270, for references to Class 75
- 198.1, 221, and 227, for references to Class 452, Butchering, subclasses 141+, for meat tenderizers having structure similar to comminutors.
- 198.1+, 270+, for references to Class 81, Tools.
- 275, for reference to Class 124, Mechanical Guns and Projectors.
- 285.1, for references to Class 52, Static Structures (e.g., Buildings).
- 292, for references to Class 73.
- 629, 650+, for references to Class 4, Baths, Closets, Sinks, and Spittoons, which class takes sinks and similar apparatus there provided for, combined with means to comminute the material discharged from the sink or the like.

### SECTION IV - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

- 15, Brushing, Scrubbing, and General Cleaning, for the cleaning, per se, of comminuting members, see the appropriate subclasses of Class 15, particularly subclass 256.5. (See Lines With Other Classes of this class definition (241)).
- 15, Brushing, Scrubbing, and General Cleaning, subclasses 3.1+, for apparatus for cleaning grain, employing means of the type there provided for. (See GRAIN, FLOUR AND STARCH section of this class (241))
- 19, Textiles: Fiber Preparation, and the notes thereto. Class 19 is the generic class for the liberation of fibers from natural and prior use sources by physical operations and also provides for miscellaneous working operations on fibrous material. Class 19 takes processes and apparatus which include fiber liberation steps or means (e.g., delinting, picking, carding, etc.)

- in combination with comminution of the material. (refer to the FIBROUS AND LAMINATED MATERIAL section of the class definition of this class (241)).
- 23, Chemistry: Physical Processes, subclasses 293+ for physical processes for producing, reclaiming, or recovering inorganic compounds and elements. (refer to CHEMICAL COMPOUNDS, COMPOSITIONS, FOODS AND BEVERAGES section of this class (241)).
- 29, Metal Working, is the generic class for working and shaping of metal and see the notes thereto for related art. See particularly subclasses 4.51+, for processes and apparatus for forming metal into shreds. (refer to the COATING OR SHAPING OF MATERIAL section of the class definition of this class (241)).
- 34, Drying and Gas or Vapor Contact With Solids, and the notes thereto, particularly (3) Note in the class definition. (see the HEATING, COOLING, OR DRYING MATERIAL section of the class definition of this class (241)).
- 37, Excavating, for apparatus and corresponding processes including excavation of material. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (B) of this class (241)).
- 44, Fuel and Related Compositions, subclass 633 for devices for disintegrating and plasticizing peat. (refer to the FIBROUS AND LAMINATED MATERIAL section of the class definition of this class (241)).
- 47, Plant Husbandry, subclass 58.1, for processes of treating seed in preparation for planting. (See GRAIN, FLOUR AND STARCH section of this class (241)).
- 53, Package Making, subclass 121 for packaging apparatus including means to crush the contents.
- 56, Harvesters, appropriate subclasses, for processes and apparatus including the severing of crops. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (B) of this class (241))
- 60, Power Plants, subclasses 325+ for fluid transmission and fluid link actuating devices. (Refer to the OPERATORS FOR COMMUNUTORS section of this class (241)).
- 62, Refrigeration, and the notes thereto. (See the HEATING, COOLING, OR DRYING MATERIAL section and Lines With Other Classes of the class definition of this class (241)).
- 69, Leather Manufactures, for processes and apparatus for treating leather not elsewhere provided for. Also see Lines With Other Classes of this class (241).
- 72, Metal Deforming, appropriate subclasses, for a metal-working roll organization similar to those used in comminuting apparatus.
- 72, Metal Deforming, and see the notes thereto, for a process or apparatus for shaping metal by plastically working it. (refer to the COATING OR SHAPING OF MATERIAL section of the class definition of this class (241)).
- 74, Machine Element or Mechanism, for mechanical movement actuating means. (refer to the OPERATORS FOR COMMUNUTORS section of this class (241)).
- 83, Cutting, appropriate subclasses, for process and apparatus for cutting of the type there provided for, which are disclosed for the purpose fo severing solid material into products of desired length or shape while (usually) retaining an original dimension. (refer to the COATING OR SHAPING OF MATERIAL section of the class definition of this class (241)).
- 91, Motors: Expansible Chamber Type, for expansible chamber motor actuators. (Refer to the OPERATORS FOR COMMUNUTORS section of this class (241)).
- 95, Gas Separation: Processes, for a process of separating solids from gases, per se. (See SEPARATION OF MATERIAL of the class definition of this class (241)).
- 96, Gas Separation: Apparatus, for apparatus for separating solids from gases, per se. (See SEPARATION OF MATERIAL of the class definition of this class (241)).
- 99, Foods and Beverages: Apparatus, appropriate subclasses, for apparatus for imparting a shape to food material. (Refer to the COATING OR SHAPING OF MATERIAL section of the class definition of this class (241)).
- 99, Foods and Beverages: Apparatus, appropriate subclasses and the notes thereto for the preservation and production of foods and beverages. (refer to CHEMICAL COMPOUNDS, COMPOSITIONS, FOODS AND BEVERAGES section and Lines With Other Classes of the class definition of this class (241)).
- 99, Foods and Beverages: Apparatus, subclasses 518+ and 600+, for apparatus for husking or peeling grain and treating cereals, not elsewhere provided for. (See GRAIN, FLOUR AND STARCH section of this class (241)).
- 106, Compositions: Coating or Plastic, and the notes thereto. See particularly the main class definition for a list of classes and subclasses

- providing for coating and plastic compositions containing solid material. (Refer to CHEMICAL COMPOUNDS, COMPOSITIONS, FOODS AND BEVERAGES section of this class (241)).
- 110, Furnaces, and the Notes thereto. (See the HEATING, COOLING, OR DRYING MATERIAL section and LINES WITH OTHER CLASSES of the class definition of this class (241)).
- 114, Ships, and the notes thereto for marine vehicle mounting means. (See COMMUNOTOR OR COMMUNOTOR ELEMENT SUPPORTS AND MOUNTING MEANS section of this class (241)).
- 118, Coating Apparatus, appropriate subclasses, for coating particulate material and see especially subclasses 19 and 417 for tumbling particulate work. For merely mixing fluent materials with grain by agitation, see the Note to Class 259 below. (See GRAIN, FLOUR AND STARCH section of this class (241)).
- 118, Coating Apparatus, appropriate subclasses. (Refer to the COATING OR SHAPING OF MATERIAL section of the class definition of this class (241)).
- 123, Internal-Combustion Engines, for operators of the type there provided for. (Refer to the OPERATORS FOR COMMUNOTORS section of this class (241)).
- 125, Stone Working, and the notes thereto for processes and apparatus for shaping stone-like substances. (Refer to the COATING OR SHAPING OF MATERIAL section of the class definition of this class (241)).
- 125, Stone Working, subclasses 23+, for processes and apparatus for splitting laminated material (e.g., mica) along its planes of cleavage. Class 241 takes the comminution of such material, see particularly subclass 4. (Refer to the FIBROUS AND LAMINATED MATERIAL section of the class definition of this class (241)).
- 126, Stoves and Furnaces, subclasses 152+, for grates. The line between classes 126 and 241 is the same as the line set forth between classes 110 and 241, above. (See the HEATING, COOLING, OR DRYING MATERIAL section of the class definition of this class (241)).
- 127, Sugar, Starch, and Carbohydrates, appropriate subclasses, for processes and apparatus for producing a purified starch product, which may include comminuting steps or means as part of the combination. (See GRAIN, FLOUR AND STARCH section of this class (241)).
- 131, Tobacco, subclasses 145+ for tobacco leaf disintegration. (Refer to the FIBROUS AND LAMINATED MATERIAL section of the class definition of this class (241)).
- 134, Cleaning and Liquid Contact With Solids, appropriate subclasses, for apparatus for cleaning and/or applying liquid to grain not provided for elsewhere. (See GRAIN, FLOUR AND STARCH section of this class (241)).
- 138, Pipes and Tubular Conduits, subclasses 40+, and the notes thereto for flow restrictors which form emulsions of a plurality of fluids. (Refer to SUSPENSION AND COLLOIDS section of this class (241)).
- 141, Fluent Material Handling, With Receiver or Receiver Coacting Means, appropriate subclasses for processes and apparatus for filling receivers including, in subclasses 11+ and 69+, treatment of the material other than by comminution. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (A) of this class (241)).
- 144, Woodworking, and the notes thereto. Class 144 is the generic class for shaping wood and similar materials. For example, Class 144, includes wood excelsior making, log slicers, etc. A machine for wood chipping or shaving will be considered as imparting a desired shape only if there exists some means for so shaping as, e.g., the operation of the machine moves the wood holder with respect to the cutter, or the cross section of the cutter or chipper is so designed as to produce the desired contour. (Refer to the COATING OR SHAPING OF MATERIAL section of the class definition of this class (241)).
- 148, Metal Treatment, appropriate subclasses for processes of heat treating metal to modify or maintain the internal physical structure (i.e., microstructure) or chemical property of the metal. (See the HEATING, COOLING, OR DRYING MATERIAL section of the class definition of this class (241)).
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, appropriate subclasses for processes and apparatus for shaping combined with a laminating step and see also subclasses 339+. (Refer to the COATING OR SHAPING OF MATERIAL section of the class definition of this class (241)).
- 162, Paper Making and Fiber Liberation, appropriate subclass, for the combination of a chemical



- digestion and comminution. (Refer to the FIBROUS AND LAMINATED MATERIAL section of the class definition of this class (241)).
- 162, Paper Making and Fiber Liberation, appropriate subclasses, for processes and apparatus for the chemical liberation, recovery or purification of natural cellulose or fibrous material in combination with a comminuting step. (Refer to SUSPENSION AND COLLOIDS section of this class (241)).
- 164, Metal Founding, subclasses 344+ and 401+ for apparatus to remove a molding surface from a product which may include a disintegration of a sand surface, and subclasses 131+ for corresponding methods.
- 171, Unearthing Plants or Buried Objects, appropriate subclasses, and particularly subclasses 24, 26+, 114+, and 122 for devices for recovering from the soil plants or objects buried or embedded therein, combined with means to comminute such plants or objects or the mass of earth containing the same. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (B) of this class (241)).
- 172, Earth Working, appropriate subclasses for comminuting earth in situ. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (B) of this class (241)).
- 173, Tool Driving or Impacting, appropriate subclass for subject matter directed to driving or impacting a tool, when such subject matter includes combined features peculiar to tool driving, but which does not include features limiting the subject matter to a specific tool art, such as specific shape of the work contacting portion of a tool, related tools, or an opposed work support. Class 241 has not been cleared as to subject matter in conflict with this line. (Refer to the OPERATORS FOR COMMUNUTORS section of this class (241)).
- 175, Boring or Penetrating the Earth, appropriate subclass for a process or means for comminuting the substances of the earth in situ to bore or penetrate the earth. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (B) of this class (241)).
- 184, Lubrication, for lubricators and lubrication systems, per se; this class (241) includes combinations of significant comminutor structure with means to lubricate. (See GRAIN, FLOUR AND STARCH section of this class (241)).
- 185, Motors: Spring, Weight, and Animal Powered, for miscellaneous motor operators. (Refer to the OPERATORS FOR COMMUNUTORS section of this class (241)).
- 193, Conveyors, Chutes, Skids, Guides, and Ways, for conveyors of the type there provided for. See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (A) of this class (241)).
- 198, Conveyors: Power-Driven, for processes and apparatus relating to power-driven conveyors.
- 209, Classifying, Separating, and Assorting Solids, for a process and apparatus relating to the separation of solids into grades or classes. (See SEPARATION OF MATERIAL and Lines With Other Classes of the class definition of this class (241)).
- 209, Classifying, Separating, and Assorting Solids, see particularly subclass 7 for devices which apply pressure to material to effect a change in its shape, in contradistinction to comminution, to facilitate separation.
- 210, Liquid Purification or Separation, for a process or apparatus relating to the separation of a solid from a liquid as by gravitational separation or filtering. As an exception to the general line, Class 210, in subclasses 173+, provides for apparatus including a filtering screen or the like arranged to remove material from a moving stream and to comminute the removed material. In addition Class 210 includes vegetable or animal matter comminution incidental to liquid purification, see particularly subclasses 173 and 174, or destruction of a filter cake or comminution incidental to agitation or feeding of the material to, during and after separation, see particularly subclasses 106+, 178, 179, 219, 298, 319, 332+, 353, 354+, 383, 391+, 407+, 738, 748, 769, 785, and 796. (see SEPARATION OF MATERIAL of the class definition of this class (241)).
- 212, Traversing Hoists, for material handling of the type there provided for. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (A) of this class (241)).
- 219, Electric Heating, for processes and apparatus relating to the electric heating of material. (See the HEATING, COOLING, OR DRYING MATERIAL section of the class definition of this class (241)).
- 221, Article Dispensing, appropriate subclasses for processes and apparatus for dispensing articles not otherwise provided for. (See MATERIAL

- HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (A) of this class (241)).
- 222, Dispensing, for processes and apparatus for dispensing material. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (A), and Lines With Other Classes of this class (241)).
- 225, Severing by Tearing or Breaking, appropriate subclasses, for severing by tearing or breaking. See particularly subclasses 1+ for processes, and subclasses 93+ for apparatus for severing a piece of work into smaller pieces where there is either (1) a claimed provision for maintaining or determining the product shape or size, (e.g., the tool has a shaped edge), or (2), where the material being worked upon is disclosed as modified (e.g., by score lines) so as to determine a specific size or shape. (Refer to the COATING OR SHAPING OF MATERIAL section of the class definition of this class (241)).
- 239, Fluid Sprinkling, Spraying, and Diffusing, subclasses 650+ for a container for nonfluid material and means for strewing or scattering the material over an extended area, and in which combination a comminutor may be present to disintegrate or break up lumps in the material. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (B) of this class (241)).
- 248, Supports, subclasses 2+, for machinery supports. For proper classification in Class 248, the claims should include, in the combination, only so much of the comminutor as is necessary to support it. (See COMMINUTOR OR COMMUNUTOR ELEMENT SUPPORTS AND MOUNTING MEANSs section of this class (241)).
- 252, Compositions, appropriate subclasses. This is the generic class for compositions and see the notes thereto for other composition art. Colloidal dispersions are treated in the suspension and colloids section of this class definition. (Refer to CHEMICAL COMPOUNDS, COMPOSITIONS, FOODS AND BEVERAGES section of this class (241)).
- 252, Compositions, subclasses 302+, and the notes thereto. (See subclasses 38+). (Refer to SUSPENSION AND COLLOIDS section and Lines With Other Classes of this class (241)).
- 252, Compositions, subclass 378 for processes of exfoliating micaceous material. (Refer to the FIBROUS AND LAMINATED MATERIAL section of the class definition of this class (241)).
- 260, Chemistry of Carbon Compounds, appropriate subclasses. See the notes to this class for processes relating to the production, reclamation or recovery of carbon compounds, including rubber, synthetic resins and compositions containing the same. (Refer to CHEMICAL COMPOUNDS, COMPOSITIONS, FOODS AND BEVERAGES section of this class (241)).
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses for processes of molding or shaping plastic materials within the class definition, which may include a particle forming or material cutting or comminution step, e.g., subclasses 5+, 115+, 118, 138, and 603. (Refer to the COATING OR SHAPING OF MATERIAL section of the class definition of this class (241)).
- 266, Metallurgical Apparatus, for apparatus for heat treating metal. (See the HEATING, COOLING, OR DRYING MATERIAL section and Lines With Other Classes of the class definition of this class (241)).
- 280, Land Vehicles, and the notes thereto for land vehicle mounting means. (See COMMUNUTOR OR COMMINUTOR ELEMENT SUPPORTS AND MOUNTING MEANS section of this class (241)).
- 299, Mining or In Situ Disintegration of Hard Material, for a process or apparatus for recovering valuable material from the earth or breaking up hard material in situ. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (B) of this class (241)).
- 310, Electrical Generator or Motor Structure, appropriate subclasses for electric motor structure. (Refer to the OPERATORS FOR COMMUNUTORS section of this class (241)).
- 312, Supports: Cabinet Structure, subclasses 35+ for magazine type article containing cabinets having means facilitating article removal. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (A) of this class (241)).
- 340, Communications: Electrical, appropriate subclasses for electric signals, per se, for indicating a condition in a comminutor, particularly subclasses 500+ and 870.01+. (See COMMUNUTOR OR COMMINUTOR ELEMENT SUPPORTS AND MOUNTING MEANS section of this class (241)).
- 340, Communications: Electrical, appropriate subclasses for electric signals, per se, for indicat-

- ing a condition in a comminutor. Note particularly subclasses 500+ and 870.01+. (See SEPARATION OF MATERIAL of the class definition of this class (241)).
- 373, Industrial Electric Heating Furnaces, and the notes thereto, for electric furnaces and processes relating thereto. (See the HEATING, COOLING, OR DRYING MATERIAL section of the class definition of this class (241)).
- 366, Agitating, appropriate subclasses, for apparatus for merely mixing liquids or solids with grain by agitation. (See GRAIN, FLOUR AND STARCH section of this class (241)).
- 366, Agitating, particularly subclasses 176.1+ for process and apparatus for forming suspensions and emulsions by agitation. See the general line with Class 366, set forth in the main class definition of Class 252. (Refer to SUSPENSION AND COLLOIDS section of this class (241)).
- 366, Agitating, See Lines With Other Classes of this class (241).
- 384, Bearings, which class takes bearings and guides for comminuting elements or element support members and such bearings or guides combined with supports for the bearings or guides. The member supported by the bearing or guide may be included by name as a type of comminuting element where no significant structure of the element is included. (see COMMINUTOR OR COMMINUTOR ELEMENT SUPPORTS AND MOUNTING MEANS section of this class (241)).
- 403, Joints and Connections, for rigid shaft to comminutor element connections where no significant structure of the comminuting element other than that necessary to effect the connection is included. (See COMMINUTOR OR COMMINUTOR ELEMENT SUPPORTS AND MOUNTING MEANS section of this class (241)).
- 404, Road Structure, Process, or Apparatus, subclasses 90+ for in situ comminution of earth or road surfaces in combination with other road building means. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (B), and Lines With Other Classes of this class (241)).
- 406, Conveyors: Fluid Current, for fluid current conveying organizations. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (A), and References To the Current Class of this class (241)).
- 414, Material or Article Handling, which is the generic class for processes and apparatus dealing with material and article handling. (See MATERIAL HANDLING, EXCAVATING, DISTRIBUTING, HARVESTING, (A) of this class (241)).
- 415, Rotary Kinetic Fluid Motors or Pumps, appropriate subclasses for rotary fluid motor operators and controls. (Refer to the OPERATORS FOR COMMINUTORS section of this class (241)).
- 416, Fluid Reaction Surfaces (i.e., Impellers), appropriate subclasses for operators and controls for impellers. (Refer to the OPERATORS FOR COMMINUTORS section of this class (241)).
- 417, Pumps, takes pumps including structural features which both facilitate the impelling of the fluid and produce incidental concurrent comminution of solids suspended in the fluid. Also see Lines with Other Classes of this class (241)
- 418, Rotary Expansible Chamber Devices, for rotary expansible chamber motor actuators. (Refer to the OPERATORS FOR COMMINUTORS section of this class (241)).
- 418, Rotary Expansible Chamber Devices, for expansible chamber devices having structural features which both facilitate the impelling of the fluid and produce incidental concurrent comminution of solids suspend in the fluid. Class 241 provides for (1) comminutors provided with means for pumping suspending fluid to or from a comminuting zone, and (2) devices having the primary disclosed purpose of comminuting the material, but which may have the additional incidental function of impelling the fluid.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, appropriate subclasses for apparatus for producing, reclaiming, or recovering inorganic compounds or elements. (Refer to CHEMICAL COMPOUNDS, COMPOSITIONS, FOODS AND BEVERAGES section of this class (241)).
- 423, Chemistry of Inorganic Compounds, appropriate subclasses, for recovery of inorganic compounds and nonmetallic elements by chemical reaction. (Refer to CHEMICAL COMPOUNDS, COMPOSITIONS, FOODS AND BEVERAGES section of this class (241)).

- 424, Drug, Bio-Affecting and Body Treating Compositions, appropriate subclass for a method of making such a composition and see particularly subclasses 1.29+, 417, 458+, 469+, and 489+ for a composition including comminuted or particulate material. (Refer to CHEMICAL COMPOUNDS, COMPOSITIONS, FOODS AND BEVERAGES section of this class (241)).
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclass 202 for a molding machine for shaping nonmetals combined both with a separate and distinct agitating or kneading means upstream of the shaping area and a comminuting means; and subclass 223 for the combustion of means providing an endless casting surface and harvesting means cooperating thereunder. (Refer to the COATING OR SHAPING OF MATERIAL section of the class definition of this class (241)).
- 426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses, for comminution or disintegration processes combined with some other food working operation. (Refer to CHEMICAL COMPOUNDS, COMPOSITIONS, FOODS AND BEVERAGES section of this class (241)).
- 426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses, for the process of forming colloidal suspensions or emulsions of food materials. (Refer to SUSPENSION AND COLLOIDS section of this class (241)).
- 426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses, for shaping and subclasses 289+ and 302+, for coating edible material. (Refer to the COATING OR SHAPING OF MATERIAL section of the class definition of this class (241)).
- 426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses, for treating grain to be made into a food. (See GRAIN, FLOUR AND STARCH section of this class (241)).
- 427, Coating Processes, for coating processes in general. (Refer to the COATING OR SHAPING OF MATERIAL section of the class definition of this class (241)).
- 432, Heating, subclass 61 for a residual material heating device including structure breaking up lumps formed by the heating or otherwise serving merely to perfect the heating of the material. (See the HEATING, COOLING, OR DRYING MATERIAL section of the class definition of this class (241)).
- 435, Chemistry: Molecular Biology and Microbiology, for disclosures pertinent to fermentation.
- 451, Abrading, and the notes thereto. (Refer to the COATING OR SHAPING OF MATERIAL section and Lines With Other Classes of the class definition of this class (241)).
- 451, Abrading, subclasses 326+ for apparatus for removing husks from grain by tumbling. (See GRAIN, FLOUR AND STARCH section of this class (241)).
- 460, Crop Threshing or Separating, for processes and apparatus for separating grain from the plant. (See GRAIN, FLOUR AND STARCH section of this class (241)).
- 464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, appropriate subclasses for flexible shaft to comminuting elements connections where no significant structure of the comminuting elements, other than that necessary to effect the connection, is included. See particularly subclasses 107+. (See COMMINUTOR OR COMMINUTOR ELEMENT SUPPORTS AND MOUNTING MEANS section of this class (241)).
- 494, Imperforate Bowl: Centrifugal Separators, for apparatus or and process for breaking up a mixture of fluids or fluent substances into two or more components by centrifuging within a generally solid-walled, receptacle-like member. (See SEPARATION OF MATERIAL of the class definition of this class (241)).
- 504, Plant Protecting and Regulating Compositions, subclasses 116.1 through 367 for processes of treating seed by the mere application of a chemical for the purpose of affecting the growth of the plant. (See GRAIN, FLOUR AND STARCH section of this class (241)).

#### SUBCLASSES

- 1** This subclass is indented under the class definition. Processes in which the comminution or disintegration is effected by an operation of the material other than the application of force to the material by contacting it with a solid surface.
- (1) Note. Contained in this subclass, for example, are those processes in which the mere application of heat results in

comminution and those where the material is disintegrated by the generation and sudden release of internal pressure. The term "solid surface" has been considered to include particles of the material undergoing treatment, so that processes in which the material is disintegrated by contacting it with other portions of the same material will be found classified in other appropriate subclasses in this class.

- (2) Note. Operations on material which result in a chemical change are not included. See CHEMICAL COMPOUNDS, COMPOSITIONS, FOODS AND BEVERAGES of the class definition.

SEE OR SEARCH CLASS:

- 99, Foods and Beverages: Apparatus, subclasses 323.4+, for apparatus for puffing cereal wherein the seed is not comminuted.
- 175, Boring or Penetrating the Earth, subclasses 11+ for a process or means for boring a hole in the earth by directly applying heat to fluidize or comminute the material forming the earth.
- 606, Surgery, subclass 2.5 for subject matter relating to removal of a calculus (e.g., stone) from the body wherein the calculus is fractured or disintegrated by use of light energy.

- 2 This subclass is indented under the class definition. Processes in which the comminution or disintegration results in the rupturing of cells in the material or the liberation of liquids in the material or some operation in addition to the comminution or disintegration, to rupture the cells or liberate contained liquids.

SEE OR SEARCH CLASS:

- 99, Foods and Beverages: Apparatus, appropriate subclasses.
- 100, Presses, subclasses 104+ for presses not elsewhere classified, having drain means for expressed liquid.
- 260, Chemistry of Carbon Compounds, appropriate subclasses.
- 435, Chemistry: Molecular Biology and Microbiology, subclass 259 for processes wherein a microorganism is

ruptured by added material or mechanical means and subclass 306.1 for apparatus with means to lyse or rupture microorganisms by addition of material or by mechanical means other than comminution.

- 3 This subclass is indented under the class definition. Processes in which the material (1) is solidified, consolidated, or shaped into a desired form prior to comminution, or (2) a portion only of the material is formed into a desired shape, simultaneously with the comminution of that portion of the material which is not shaped.

- (1) Note. See COATING OR SHAPING OF MATERIAL of the class definition for notes to related art and a statement of the line followed in relation to other classes as to processes including shaping operations.

SEE OR SEARCH CLASS:

- 100, Presses, subclasses 94+, for processes and apparatus for consolidating material and such steps or means in combination with a precedent comminuting step or means.
- 209, Classifying, Separating, and Assorting Solids, subclass 7, for processes and apparatus for selectively changing the shape (without comminution) of certain ingredients in a mixture to enable better separation of the material into grades.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses for processes for shaping or molding plastic material within the class definition, which may include a comminution or disintegration step, see particularly subclasses 5+, 115+, 118, 138+, and 603+.

- 4 This subclass is indented under the class definition. Processes in which fibrous or laminated mineral material (e.g., mica, asbestos, etc.) is the material being comminuted or disintegrated.

- (1) Note. This subclass includes physical steps of separation of the laminations of

material when combined with the comminuting or disintegrating step.

- (2) Note. See FIBROUS AND LAMINATED MATERIAL of the class definition of this class for notes to related art and a statement of the lines followed with other classes relative to fibrous or laminated mineral material.

SEE OR SEARCH CLASS:

- 19, Textiles: Fiber Preparation, subclass .56 for methods of and means for opening bundles of substantially parallel stapled fibers in combination with a stapilizing step or device, and subclasses 66 and 80+ for fiber mass opening processes and apparatus of general application.
- 125, Stone Working, subclasses 23.01+, for processes and apparatus for splitting mineral laminated material without comminution.
- 252, Composition, subclass 378, for processes of exfoliating or expanding mineral laminated material where no comminution or disintegration is involved or processes in which comminution or disintegration is a step, but including operations not provided for in this class (241).
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses, see reference in the class definitions of this class (241), COATING OR SHAPING OF MATERIAL, B.
- 432, Heating, subclass 13 for a heating process including a melting, expanding or comminution step.

- 5 This subclass is indented under the class definition. Processes which include the step of suspending particles of the material in a moving fluid or otherwise projecting them through space and utilizing the developed kinetic energy of the particles to effect the comminution or disintegration thereof (as by impinging them against an impact surface or against other particles).

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 26, for processes of comminuting material by contacting it with other portions of the material but without the use of kinetic energy.
- 27, and 185.5-197, for processes and apparatus for comminuting by subjecting the material to a blow by a moving surface, but which do not utilize the kinetic energy of the material to aid in the comminution.
- 39+, for related apparatus including means to suspend particles in a moving fluid and then utilizing the kinetic energy to effect the comminution.
- 91, and 274, for related apparatus including means to gravity project material against a surface or other material to effect the comminution.
- 275, for related apparatus for centrifugally projecting material against surfaces or other material to effect the comminution.

SEE OR SEARCH CLASS:

- 99, Foods and Beverages: Apparatus, subclasses 519 and 571 for apparatus employing kinetic energy for separation of food portion.
- 406, Conveyors: Fluid Current, appropriate subclasses for processes and apparatus for conveying solids by a fluid current. See particularly subclasses 157+ for a deflecting surface at the conveyor outlet.

- 6 This subclass is indented under the class definition. Processes in which the material being comminuted or disintegrated is cereal seed (wheat, corn, etc.) or other seed (coffee, cottonseed, etc.) or parts of such seed.

- (1) Note. See GRAIN, FLOUR, AND STARCH of the class definition of this class for notes to related art and the lines followed with other classes, as to grain, flour, etc.

## SEE OR SEARCH CLASS:

- 99, Foods and Beverages: Apparatus, appropriate subclasses, for apparatus relating to the treatment of cereal and other seeds.
- 127, Sugar, Starch, and Carbohydrates, for processes and apparatus for producing and recovering purified starch from cereal starch-bearing materials.
- 426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses for processes involving the treatment of cereal and other seeds.

- 7 This subclass is indented under subclass 6. Processes in which the comminution or disintegration is combined with an operation on the seed or seed part which functions to loosen or remove the outer coating or husk portion from the seed or seed part.

- (1) Note. The operation to remove or loosen the husk portion must be of a character other than comminution of the inner body of the grain.

## SEE OR SEARCH CLASS:

- 426, Food or Edible Material: Processes, Compositions, and Products, especially subclasses 287+ and 482+, for processes of removing food grain husks, per se, or combined with chemical or other food working operations.

- 8 Processes and apparatus in which the comminution or disintegration is combined with the step of operating on the whole seed prior to comminution by the application of a fluid thereto or the heating or cooling thereof.

- (1) Note. See HEATING, COOLING, OR DRYING MATERIAL of the class definition of this class for notes to related art on heating, cooling, or drying, and a discussion of the lines followed with other classes.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 7, for processes involving the application of a fluid to, or the heating or

cooling of, whole seeds in order to detach or loosen the husk portions.

- 12, for processes in which fluid is applied to comminuted seed parts rather than whole seed.
- 15, for processes in which fluid is applied to material other than cereal or other seeds.
- 62, and 65, for apparatus in which the comminutor or disintegrator is combined with means to apply a fluid to or heat or cool the material prior to being treated in the comminutor.

## SEE OR SEARCH CLASS:

- 99, Foods and Beverages: Apparatus, appropriate subclasses, for apparatus including the application of a fluid to or heating or cooling of cereal or other seeds to carry out operations not provided for as combinations in this class.

- 9 This subclass is indented under subclass 6. Processes in which the comminution or disintegration is combined with an operation on the material to separate or classify it into classes or grades according to their physical characteristics.

- (1) Note. See SEPARATION OF MATERIAL of the class definition of this class for notes to related separating classes and a statement of the lines followed relative to those classes.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

- 19, and 20, for related processes applied to material other than cereal or other seeds and involving the use of a fluid.
- 24.1+, for a process related to that of this subclass, applied to material other than cereal or other seed.
- 68+, for comminuting or disintegrating apparatus combined with means to separate or classify the material.

## SEE OR SEARCH CLASS:

- 209, Classifying, Separating, and Assorting Solids, for processes and apparatus for separating or classifying material.

- 10** This subclass is indented under subclass 9. Processes in which one or more of the grades or classes of separated material is recombined with another separated part or is recirculated to combine with material not yet operated on by the separator.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
52+, 61 and 80, for apparatus in which material is recirculated between the comminutor and separator.
- 11** This subclass is indented under subclass 9. Processes in which the material is subjected to successive alternate comminuting and separating operations, each operation occurring two or more times.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
19, and 20, for processes including alternate successive comminuting and separating steps in which the latter includes the use of a fluid.  
24.1+, for a process having the above defined characteristic applied to material other than cereal or other seed.  
76, and the notes thereto, for corresponding apparatus.
- 12** This subclass is indented under subclass 6. Processes in which the comminution or disintegration is combined with the step of applying a fluid to the material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
8, for processes involving the application of a fluid to whole seeds.  
15+, for processes directed to the comminution or disintegration of materials other than cereals or other seeds and including the step of applying fluid to the material.  
38+, for comminuting or disintegrating apparatus combined with means to apply a fluid to the material.
- SEE OR SEARCH CLASS:  
34, Drying and Gas or Vapor Contact With Solids, appropriate subclasses, for processes and apparatus of drying and/or gas or vapor contact with material.
- 426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses, especially subclasses 288, 482+ and 507+, for processes involving the application of a fluid to cereal and other seeds.
- 13** This subclass is indented under subclass 6. Processes in which the seed or seed part is subjected to a plurality of comminuting or disintegrating operations.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
29, for plural successive comminuting or disintegrating steps applied to material other than seeds or seed parts.  
152.1+, for apparatus including a plurality of comminuting zones arranged for serial flow of material therethrough.
- 14** This subclass is indented under the class definition. Processes in which solids comprising mixed or bonded materials of diverse character are subjected to such a step of comminution or disintegration that one of the mixed or bonded materials is reduced in size to a greater extent than another of the materials.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
3, for processes in which, during the comminution of the material, a shape is imparted to certain ingredients.  
6+, for differential comminution or disintegration of cereal or other seeds.  
102, for comminuting apparatus in which the surface of the elements are deformable.
- SEE OR SEARCH CLASS:  
209, Classifying, Separating, and Assorting Solids, subclasses 4+, for treatment other than comminution for selectively changing the characteristics of ingredients of a mixture to enable better separation of the material into grades.



- 426, Food or Edible Material: Processes, Compositions, and Products, subclass 483, for the process including abrading to remove outer covering of food plant material.
- 15** This subclass is indented under the class definition. Processes in which operation of comminuting or disintegrating is (1) combined with one or more steps of applying a fluid or lubricant to the material or (2) is carried out in the presence of a previously applied fluid.
- (1) Note. The fluid may be applied before, during, and/or after the comminuting operation.
- (2) Note. See Suspensions and Colloids under the Class Definition of this class for a statement relative to related art and the lines with other classes as to the formation of suspension or colloids by comminution.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 5, for processes in which material which is movably suspended in or projected through, a fluid is comminuted or disintegrated by utilizing its kinetic energy.
- 8, 9+ and 12, for processes of comminuting cereals or other seeds or seed parts combined with steps of applying a fluid to the material.
- 38+, for apparatus in which the comminutor or disintegrator is combined with, or embodies, means to apply a fluid to the material.
- SEE OR SEARCH CLASS:
- 34, Drying and Gas or Vapor Contact With Solids, for processes and apparatus for contacting solids with gas or vapor.
- 406, Conveyors: Fluid Current, for processes and apparatus for conveying material by a fluid current.
- 16** This subclass is indented under subclass 15. Processes in which a fluid is applied (1) to aid dispersion of the comminuted particles in a fluid, or (2) to prevent chemical reaction in the material (including oxidation or ignition), deliquescence, agglomeration of the comminuted particles or frothing of the fluid suspending medium.
- (1) Note. See Suspensions and Colloids under the Class Definition of this class for a statement relative to related art and the lines with other classes as to the formation of suspension or colloids by comminution.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 22, for comminuting processes involving the addition of solids to the material which may have one of the above stated functions.
- 17** This subclass is indented under subclass 15. Processes in which the steps of comminuting or disintegrating and applying a fluid to the material are combined with an additional heating or cooling step.
- (1) Note. The added step of heating or cooling may be effected by a further application of a heated or cooled fluid.
- (2) Note. See HEATING, COOLING, OR DRYING MATERIAL of the class definition of this class for a statement of the line followed between this class and those dealing with the heating, cooling, or drying of material.
- (3) Note. See Suspensions and Colloids under the Class Definition of this class for a statement relative to related art and the lines with other classes as to the formation of suspension or colloids by comminution.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 18, for processes in which the comminuting or disintegrating is combined with a single application of a gas or vapor to effect a heating or cooling of the material.
- 41+, for apparatus including means for applying fluid at a plurality of points.

## SEE OR SEARCH CLASS:

34, Drying and Gas or Vapor Contact With Solids, appropriate subclasses, for processes and apparatus involving plural steps of applying gas or vapor to solid material.

- 18** This subclass is indented under subclass 15. Processes in which the fluid applied to the material comprises a gas or vapor.

(1) Note. See Suspensions and Colloids under the Class Definition of this class for a statement relative to related art and the lines with other classes as to the formation of suspension or colloids by comminution.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

38+, for apparatus including means for applying gas or vapor to the material.

## SEE OR SEARCH CLASS:

34, Drying and Gas or Vapor Contact With Solids, and the notes thereto, for processes and apparatus for applying gas or vapor to solid material.

- 19** This subclass is indented under subclass 18. Processes in which the gas or vapor is applied to effect a separation or classification of the material.

(1) Note. See SEPARATION OF MATERIAL and Lines With Other Classes of the class definition of this class for a statement relative to related art and the lines followed with other classes.

(2) Note. See Suspensions and Colloids under the Class Definition of this class for a statement relative to related art and the lines with other classes as to the formation of suspension or colloids by comminution.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

9+, for similar processes applied to cereals or other seeds.

38+, for apparatus including means to apply a gas or vapor to effect a separation of the material.

## SEE OR SEARCH CLASS:

209, Classifying, Separating, and Assorting Solids, appropriate subclasses, especially subclasses 133+, and the notes thereto, for processes and apparatus for separating or classifying material through the use of a gas or vapor.

- 20** This subclass is indented under subclass 15. Processes in which there is applied to the material a liquid which functions to effect a separation or classification of the material according to its physical characteristics.

(1) Note. See SEPARATION OF MATERIAL and Lines With Other Classes of the class definition for a statement relative to related art and the lines followed with other classes.

(2) Note. See Suspensions and Colloids under the Class Definition of this class for a statement relative to related art and the lines with other classes as to the formation of suspension or colloids by comminution.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

9+, for processes involving the use of a liquid separating or classifying agent as applied to cereal or other seeds.

38+, for comminuting or disintegrating apparatus combined with means to apply a liquid to the material either to effect a separation or classification or for some other purpose.

## SEE OR SEARCH CLASS:

209, Classifying, Separating and Assorting Solids, appropriate subclasses, for processes and apparatus for separating and classifying material including steps of or means for applying liquid to the material.

- 21** This subclass is indented under subclass 15. Processes in which the liquid is applied to the material or the material is treated in a liquid,

for the purpose of forming a pulp or suspension of the material particles therein.

- (1) Note. See SUSPENSION AND COLLOIDS and Lines With Other Classes of the class definition of this class for a statement relative to related art and the lines followed with other classes as to the formation of suspension or colloids.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 38+, especially 46.01+, for apparatus in which the comminution or disintegration is effected in a body of liquid.

SEE OR SEARCH CLASS:

- 162, Paper Making and Fiber Liberation, appropriate subclasses for processes and apparatus for paper making, and see Lines With Other Classes of the class definition of this class for the stated line between Class 162 and Class 241.
- 366, Agitating, for processes and apparatus for mixing solids and liquids to form a pulp or suspension but including no comminution.

- 22** This subclass is indented under the class definition. Processes in which the comminution or disintegration is combined with the step of adding a solid to the material.

- (1) Note. See CHEMICAL COMPOUNDS, COMPOSITIONS, FOODS AND BEVERAGES and Lines With Other Classes of the class definition of this class for a statement of the line followed with the composition classes as to processes including the addition of solids to the material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 15+, for processes including the application of a fluid to the material. Where the added material is solid when applied, but changes its form to a fluid while applied to the material, this has been considered to be fluid application for subclasses 15+.

SEE OR SEARCH CLASS:

- 106, Compositions: Coating or Plastic, for processes for forming coating or plastic compositions by the comminution or disintegration of a plurality of ingredients.
- 252, Compositions, for processes of forming compositions by comminution of a plurality of solids.
- 451, Abrading, subclasses 32+ for an abrading process involving the addition of a loose abrasive to the material.

- 23** This subclass is indented under the class definition. Processes in which the step of comminution or disintegration is combined with the step of modifying or maintaining the temperature of the material by the application of heat to, or the extraction of heat from, the material, other than by the application of a fluid directly thereto.

- (1) Note. See HEATING, COOLING, OR DRYING MATERIAL and Lines With Other Classes of the class definition of this class for notes to related arts and a statement of the lines followed with related classes.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 8, for processes involving heating or cooling of whole seeds.
- 15+, for processes in which a fluid is applied to the material to modify the temperature thereof or for other purposes, including, in subclass 18, the combination with an additional heating or cooling step.
- 18, see note to subclass 15 above.
- 65+, and the notes thereto, for comminuting or disintegrating apparatus combined with means to modify the temperature of the material.

**24.1 With classifying or separating of material:**

This subclass is indented under the class definition. Process in which the material, in addition to undergoing the comminuting or disintegrating operation, is subjected to sorting, (i.e., a classification or separation) according to the physical characteristics of the component separated from other components of the material.

- (1) Note. See SEPARATION OF MATERIAL and Lines With Other Classes of the class definition of this class for notes to related art and for a statement of the lines followed with related classes.

- (2) Note. Included herein is sorting a single-type material according to size, color, or quality.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 9+, for a process including the combined steps of comminuting and separating or classifying as applied to cereal and other seed or seeds parts.
- 19, for a process of comminuting combined with sorting by use of a gas or vapor.
- 20, for a process directed to the combination of comminuting with separating or classifying by use of a liquid.
- 68+, for comminuting apparatus combined with means to classify or separate the material.

SEE OR SEARCH CLASS:

- 209, Classifying, Separating, and Assorting Solids, for a process for subjecting the material to a classification or separation when not combined with significant comminuting.
- 210, Liquid Purification or Separation, and see the reference to Class 210 in References to Other Classes of the class definition of this class.

#### **24.11 Including separating liquid from solid:**

This subclass is indented under subclass 24.1. Process of comminuting and separating including sorting a component in the flowable state from a component in the nonflowable state.

- (1) Note. Pelletized solid material is not a liquid since it is not "in the flowable state" even though it may flow.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 19, for comminuting combined with sorting by use of material in the gaseous state wherein the gaseous material is

utilized to enhance the sorting operation.

- 20, for comminuting combined with sorting by use of material in the liquid state wherein the liquid material is utilized to enhance the sorting operation.

#### **24.12 Of plural, diverse materials:**

This subclass is indented under subclass 24.1. Process of comminuting and separating including sorting out a first component of a first material from a second component that is of a distinct material.

- (1) Note. Sorting of material according to size, quality, or color is not included herein.

#### **24.13 Including metal:**

This subclass is indented under subclass 24.12. Process of comminuting and separating including sorting out a component that is of any category of electropositive elements that are usually whitish, lustrous, and in the transition metals, typically ductile and malleable with high tensile strength.

#### **24.14 Magnetically, electrostatically, or by use of eddy currents:**

This subclass is indented under subclass 24.13. Process of comminuting and separating (a) utilizing magnetic attraction to draw out a ferrous, or ferrouslike component, (b) utilizing an electrostatic charge on the particles of a certain component of the material and sorting accordingly, or (c) utilizing the waves generated by moving electrical current to effect the sorting.

#### **24.15 Sorting by use of sieve:**

This subclass is indented under subclass 24.13. Process of comminuting and separating including utilizing a member having a mass of restrictive openings to pass through the small particles of a first component of material and prevent passage of the large particles of the second component.

- (1) Note. The first and second components of this subclass are of different material, not simply large and small particles of the same material.

**24.16 Including food:**

This subclass is indented under subclass 24.12. Process of comminuting and separating including sorting out a component to be used for edible consumption by an animal or fish.

- (1) Note. Sorting of waste food product to be used as plant fertilizer is not included herein.

**24.17 Including rubber:**

This subclass is indented under subclass 24.12. Process of comminuting and separating including sorting out vulcanized sap of the rubber tree, or sorting out manufactured material that is similar thereto.

**24.18 Including plastic:**

This subclass is indented under subclass 24.12. Process of comminuting and separating including sorting out a petroleum based solid component, or a component that is similar thereto.

**24.19 Including fibrous material, e.g., paper:**

This subclass is indented under subclass 24.12. Process of comminuting and separating including sorting out a component consisting of masses of strands which may be aligned to enhance their strength.

**24.2 Wood or bark:**

This subclass is indented under subclass 24.19. Process of comminuting and separating including sorting the fibrous component of material in the state produced by a growing plant.

- (1) Note. Included herein is comminuting and separating of bagasse, material made from the sugar cane plant.

**24.21 Sorting by use of sieve:**

This subclass is indented under subclass 24.19. Process of comminuting and separating including utilizing a member having a mass of restrictive openings to pass through the small particles of a first component of material and prevent passage of the large particles of the second component.

- (1) Note. The first and second components of this subclass are of different material, not simply large and small particles of the same material.

**24.22 Including glass:**

This subclass is indented under subclass 24.12. Process of comminuting and separating including sorting a component comprised of brittle, siliceous material that has previously been melted, or material that is similar thereto.

**24.23 Including clay:**

This subclass is indented under subclass 24.12. Process of comminuting and separating including sorting out a component comprised of very fine earthen particles.

**24.24 Including coal:**

This subclass is indented under subclass 24.12. Process of comminuting and separating including sorting out a component comprised of hard, carbonaceous earthen material.

- (1) Note. "Soft" coal is considered to be hard under this definition; peat is not.

**24.25 Of metal:**

This subclass is indented under subclass 24.1. Process of comminuting and separating including sorting of material that is of any category of electropositive elements that are usually whitish, lustrous, and in the transition metals, typically ductile and malleable with high tensile strength.

**24.26 Of food:**

This subclass is indented under subclass 24.1. Process of comminuting and separating including sorting material to be used for edible consumption by an animal or fish.

- (1) Note. Sorting of waste food product to be used as plant fertilizer is not included herein.

**24.27 Of rubber:**

This subclass is indented under subclass 24.1. Process of comminuting and separating including sorting vulcanized sap of the rubber tree, or sorting manufactured material that is similar thereto.

**24.28 Of plastic:**

This subclass is indented under subclass 24.1. Process of comminuting and separating including sorting petroleum based solid material, or sorting material that is similar thereto.

**24.29 Of fibrous material:**

This subclass is indented under subclass 24.1. Process of comminuting and separating particularly adapted to sort material consisting of masses of strands which may be aligned to enhance their strength.

**24.3 Of glass:**

This subclass is indented under subclass 24.1. Process of comminuting and separating including sorting brittle, siliceous material that has previously been melted, or material that is similar thereto.

**24.31 Of coal:**

This subclass is indented under subclass 24.1. Process of comminuting and separating including sorting hard, carbonaceous earthen material.

**25** This subclass is indented under the class definition. Processes in which the step of comminuting the material is combined with process steps for other purposes and not provided for above.

- (1) Note. The combined steps are in addition to the steps of feeding and/or discharging the material from the comminuting zone, controlling the flow to, through or from the comminuting zone, additional comminuting or disintegrating steps, and altering the atmospheric pressure within the comminuting zone.
- (2) Note. In this subclass, for example, will be found comminuting steps combined with steps of adding material to the feed to clean the comminuting surfaces, or steps of polishing the comminuted particles.
- (3) Note. All preceding subclasses must be investigated for particular combinations within this definition but which are specifically provided for above.
- (4) Note. See the class definition for combinations of comminuting steps with steps of other types that are provided for in other classes.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

101.01+, for corresponding combined apparatus.

**26**

This subclass is indented under the class definition. Processes in which the comminution is effected by causing one portion of the material to move relatively to another portion and in contact therewith.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

5+, and 39+, for processes and apparatus in which fluid suspended material is comminuted by mutual attrition.

30, and 170+, for processes and apparatus in which the comminution or disintegration is effected by loose comminuting bodies which move relative to the material.

274+, and 284, in order to complete the search.

SEE OR SEARCH CLASS:

451, Abrading, subclasses 32+ and 326+ for a process or apparatus for abrading by tumbling.

**27**

This subclass is indented under the class definition. Processes in which the comminution or disintegration of the material is effected by subjecting the particles thereof to a blow by a moving surface.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

5, and 39, for processes and apparatus in which material in a fluid stream is subjected to a blow by a moving surface.

86+, 185.5-197, for apparatus for comminuting material by subjecting it to the action of rotary striking members.

**28**

This subclass is indented under the class definition. Processes in which the material which is comminuted is wood or other fibrous plant material.

- (1) Note. See FIBROUS AND LAMINATED MATERIAL and Lines With Other Classes of the class definition of

this class for notes to related art and a general statement of the lines followed relative to classes dealing with fibrous material.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 2, for processes of comminuting or disintegrating wood or similar material to release liquids contained therein.
- 6+, for processes of treating cereal or other seeds.

SEE OR SEARCH CLASS:

- 83, Cutting, for cutting methods and apparatus.
- 144, Woodworking, for a miscellaneous process or machine for wood working to form a shape.
- 162, Paper Making and Fiber Liberation, appropriate subclasses, for processes and apparatus for comminuting fibrous material combined with a chemical treatment.

- 29** This subclass is indented under the class definition. Processes in which all, or a portion of, the material is subjected to a plurality of comminuting or disintegrating operations.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 13, for processes of subjecting seeds to a plurality of successive comminuting steps.
- 152.1+, and the notes thereto, for apparatus for subjecting material to a plurality of successive comminuting operations.

- 30** This subclass is indented under the class definition. Miscellaneous processes not provided for above.

- 31** This subclass is indented under the class definition. Apparatus provided with means to prevent the occurrence of explosions, to relieve the effects thereof, or to shield certain parts of the apparatus therefrom.

SEE OR SEARCH CLASS:

- 137, Fluid Handling, subclasses 455+ for relief valves of general application.

- 32** This subclass is indented under the class definition. Apparatus provided with a means which rigidly connects two comminutor parts under normal working conditions but which, on the imposition of an overload, will disconnect the parts to prevent damage to the comminutor.

- (1) Note. Included are devices having parts connected by shear pins, resettable latches and the like. Mere relief means such as biasing means for comminutor members are not included but are classified on some other basis below. For example, see subclasses 121+, 127+, 211, 230+, and 286.

SEE OR SEARCH CLASS:

- 100, Presses, subclass 169 for roll type presses having yieldable mountings for the roll.
- 192, Clutches and Power-Stop Control, subclasses 56.1+ and 150 for stop mechanisms including overload releases.
- 464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, subclasses 30+ for shaft couplings including overload release.

- 32.5** This subclass is indented under the class definition. Apparatus having motor circuit control means, the control movement of which is governed by the particular orientation or position of a sink outlet stopper.

SEE OR SEARCH CLASS:

- 4, Baths, Closets, Sinks, and Spittoons, subclasses 650+ for sink details not restricted in utility to "garbage disposers".
- 200, Electricity: Circuit Makers and Breakers, subclass 61.86 for fluid controlling valve actuators whose operation concurrently makes or breaks a circuit, and subclass 81.9 for flow responsive switches.

- 33** This subclass is indented under the class definition. Apparatus provided with means to sense a condition which means causes the operation of a control device.

- (1) Note. Comminuting members, valve bodies, and like members, which are contacted and moved or operated by the material were considered to be excluded by the above definition and will be found classified below. See the appended notes.
- (2) Note. References under "Search Class" below and similar notes to the definitions of the indented subclasses will be found to include only those classes having automatic control features most nearly analogous to the subject matter of this class.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 59, for nonautomatic gas flow control means.
- 82, for trap chambers having projected material operated closures.
- 121+, 127+, 211, 230+, and 286+, for yieldingly mounted comminutor elements adapted to move under abnormal pressure of the material thereagainst.

SEE OR SEARCH CLASS:

- 34, Drying and Gas or Vapor Contact With Solids, subclasses 524+ and the notes thereto, for automatic control for apparatus for applying gas or vapor to solids.
- 99, Foods and Beverages: Apparatus, subclasses 486+ for automatic controls in food treating apparatus.
- 100, Presses, subclasses 43+ for presses not elsewhere provided for and having automatic or material triggered control.
- 192, Clutches and Power Stop Control, subclasses 116.5+, for automatically controlled stop mechanisms of general application.
- 222, Dispensing, subclasses 52+, and the notes thereto for dispensers, per se, having automatic controls.

- 34** This subclass is indented under subclass 33. Apparatus in which the means automatically controlled is either the mechanism which feeds material to the comminuting zone or the feed control means.

- (1) Note. The various feeding subclasses of this class and the notes thereto should be searched for non-automatic feed controlling means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 32, for automatic feed controls for comminutors which comprise overload release means.
- 63+, for nonautomatic feed control means which simultaneously controls the drive and/or surface positioning means of the comminutor.

SEE OR SEARCH CLASS:

- 100, Presses, subclass 45, for presses not elsewhere provided for and having automatic or triggered control of material addition, depositing or discharging.
- 198, Conveyors: Power Driven, appropriate subclasses, for conveyors, per se, having automatic controls.
- 222, Dispensing, subclasses 52+, for automatically controlled feeders, per se.
- 414, Material or Article Handling, appropriate subclasses, for material handling devices, per se, having automatic controls.

- 35** This subclass is indented under subclass 34. Apparatus in which the condition to which the feed control is responsive is the speed of, or the effort exerted by, the comminutor drive means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 36, for devices including means to automatically control the comminutor drive means.

- 36** This subclass is indented under subclass 33. Apparatus in which the automatic control effects a change in the operation of the drive means for the comminutor.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 32, for automatic control devices for comminutor drive mechanisms which comprise overload release means.



- 63, for nonautomatic drive control means which simultaneously controls the feed and/or surface positioning means of the comminutor.

SEE OR SEARCH CLASS:

- 100, Presses, subclass 48 for presses not elsewhere provided for, and having automatic or material triggered control of the press actuating means.  
192, Clutches and Power-Stop Control, subclasses 116.5+, for stop mechanisms, per se.

- 37** This subclass is indented under subclass 33. Apparatus in which the automatic control means effects a change in the spacing of cooperating comminuting surfaces from each other.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 32, for automatic control devices for comminuting surface positioning means comprising overload release means.  
63+, for nonautomatic surface positioning means which simultaneously controls the feed and/or drive means of the comminutor.

- 37.5** This subclass is indented under the class definition. Apparatus provided with a safety feature to guard the user from physical harm.

SEE OR SEARCH CLASS:

- 83, Cutting, subclass 478 for tool-guard means, and subclasses 544+ for guard means, any of which means protects the user as it protects the tool.

- 38** This subclass is indented under the class definition. Apparatus including, or combined with, means for applying a fluid to the material.

- (1) Note. The application of the fluid may occur before, during, or after, the comminution.  
(2) Note. The term “means” as used above has been interpreted for the purpose of this classification to include any apparatus including the mill elements themselves, for inducing the flow of a fluid current or any instrumentalities controlling or directing the passage of fluid to

or from the material. Devices disclosed for treating solids in fluid suspension, but claiming no “means for applying a fluid” as defined and interpreted above were not classified in this group but will be found in other subclasses on the basis of the claimed combination.

- (3) Note. In general this class provides (in this group) the generic place for the combination of a comminutor with means to apply a gas, vapor, or liquid to the solid material being treated, without regard to the nature of the fluid applied or the purpose of the application. Accordingly, the devices found here include comminutors combined with means employing a fluid to heat or cool the material, separate it into grades, convey it, subject it to a chemical reaction, cook the material, etc. Class 34, Drying and Gas or Vapor Contact With Solids, provides the generic place for apparatus, per se, for applying gases or vapors to solids (see the class definition of Class 34 for the line with this class) and Class 134, Cleaning and Liquid Contact With Solids, provides for the generic subject matter, per se, of applying liquids to solid material. For the various special fluid application classes, a study of the notes to the aforementioned two classes should be made.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 1, 5, 8, 9+, 12, and 15+, for corresponding processes.  
68+, for apparatus including means for contacting the material with mercury coated plated or other coated objects. These devices were not interpreted to be fluid treatment combinations.

SEE OR SEARCH CLASS:

- 34, Drying and Gas or Vapor Contact With Solids, see (3) Note. above.  
99, Foods and Beverages: Apparatus, subclasses 516+ for apparatus that applies a fluid to food.  
100, Presses, subclasses 73+ for presses not elsewhere classified, having additionally, means to apply fluid to the material.

- 110, Furnaces, subclass 106, for furnaces provided with means to apply a conveying fluid to the material as well as means to comminute it.
- 134, Cleaning and Liquid Contact With Solids, see (3) Note above.
- 162, Paper Making and Fiber Liberation, appropriate subclasses, for paper making and fiber liberation apparatus combined with comminuting devices, and especially subclasses 234+ and 261.
- 451, Abrading, subclasses 449+ and 456 for an abrading device having structure similar to comminutors provided with fluid supply means.
- 39** This subclass is indented under subclass 38. Apparatus in which the movement of a fluid by which the material is suspended is employed to effect the comminution of the material.
- (1) Note. The distinction between the patents included in this subclass and those in the other fluid application subclasses, is that the devices herein employ the movement of the fluid, viz., its kinetic energy, to effect the comminution of the material to which it has been applied.
- (2) Note. Comminuting devices which project the material against a surface without supporting it on a moving fluid current are not included herein. Numerous devices of this type will be found elsewhere in this class, see particularly subclasses 91 and 274+.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 5, for corresponding processes.
- 91, see (2) Note above.
- 185.5, through 197, and the notes thereto, for apparatus in which material is subjected to impact by rotary members but in which there is no substantial suspension of the material in a moving fluid current.
- 274, see (2) Note. above.
- SEE OR SEARCH CLASS:
- 99, Foods and Beverages: Apparatus, subclass 519 for corresponding grain hullers.
- 137, Fluid Handling, subclass 268 for fluid handling systems having holder means for solid, flaky or pulverized material to be dissolved or entrained.
- 239, Fluid Sprinkling, Spraying, and Diffusing, subclasses 310+ and 336 for spraying devices provided with means to entrain a solid in a flowing fluid stream.
- 366, Agitating, subclasses 336+ for agitation effected by fluid kinetic energy by means of a stationary deflector in a flow-through mixing chamber.
- 406, Conveyors: Fluid Current, appropriate subclasses, for fluid current conveyors, per se.
- 40** This subclass is indented under subclass 39. Apparatus in which the fluid type comminution is due solely to the impact of fluid suspended material carried at a right angle against a stationary abutment surface.
- SEE OR SEARCH CLASS:
- 118, Coating Apparatus, subclasses 300+, for apparatus for projecting material against a stationary surface to be coated.
- 41** This subclass is indented under subclass 38. Apparatus provided with means for applying fluid to the same material or a portion thereof at a plurality of spaced points in the apparatus.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 17, for processes in which fluid is applied to the material a plurality of times at least one such application being for the purpose of heating or cooling the material.
- 39+, for fluid comminutors having plural fluid applying means.
- 43+, for plural comminutors each of which may be provided with a single means for applying fluid to the material.
- 52+, and 61, for apparatus in which material is recirculated to the fluid applying zone.
- SEE OR SEARCH CLASS:
- 406, Conveyors: Fluid Current, subclasses 93+ for fluid current conveyors, per se, provided with plural, spaced fluid

applying means, and see the notes thereto.

- 42** This subclass is indented under subclass 41. Apparatus in which the material is treated in a plurality of comminuting zones which may be arranged so that the material passes serially or in parallel therethrough.

SEE OR SEARCH THIS CLASS, SUBCLASS:

43+, for devices having a plurality of comminuting zones in which fluid is applied to the material in some manner other than that defined as characteristic of this group.

52+, and 61, for apparatus in which the material is recirculated between a single fluid applying zone and a single comminuting zone.

134+, and 152.1+, and the notes thereto for apparatus embodying plural comminuting zones without the fluid applying feature.

SEE OR SEARCH CLASS:

99, Foods and Beverages: Apparatus, subclasses 520+ for similar plural grain hulling zones.

- 43** This subclass is indented under subclass 38. Apparatus provided with a plurality of distinct comminuting zones.

SEE OR SEARCH THIS CLASS, SUBCLASS:

39+, for plural fluid comminutors.

42, for apparatus provided with a plurality of distinct comminuting zones and in which fluid is applied to the same material at a plurality of spaced points.

52+, and 61, for apparatus provided with fluid applying means in which the material is recirculated to the same comminuting zone.

SEE OR SEARCH CLASS:

99, Foods and Beverages: Apparatus, subclasses 520+ for similar plural grain hulling zones.

- 44** This subclass is indented under subclass 43. Apparatus in which the material flows in parallel paths through the plural comminuting zones.

(1) Note. The fluid may be applied to the material before it has separated into parallel flow paths, while it is flowing in separate paths, or after the paths have been joined.

SEE OR SEARCH THIS CLASS, SUBCLASS:

134+, for parallel flow plural comminutors.

- 45** This subclass is indented under subclass 43. Apparatus in which the fluid is applied in the form of a generally horizontal current which flows successively past the plural comminuting zones.

SEE OR SEARCH THIS CLASS, SUBCLASS:

54, for devices employing a horizontal gas current through a rotary comminuting drum, which provides only a single comminuting zone.

**46.01 Liquid submerged comminuting zone:**

This subclass is indented under subclass 38. Apparatus provided with means for maintaining the comminuting zone wholly or partially submerged in a liquid.

(1) Note. The comminuting zone of this subclass may contain standing liquid or may direct passage of liquid.

SEE OR SEARCH THIS CLASS, SUBCLASS:

39+, for apparatus intended to comminute material supported in moving fluid.

SEE OR SEARCH CLASS:

99, Foods and Beverages: Apparatus, subclasses 516+ for means to apply fluid to treat food.

**46.012 Combined with dishwasher:**

This subclass is indented under subclass 46.01. Apparatus in combination with means to remove foreign material from a vessel intended to contain food.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

101.2+, for a comminutor combined with a noncomminuting material treating means, generally.

185.6, for the combination of a comminuting device with a pump, generally.

SEE OR SEARCH CLASS:

415, Rotary Kinetic Fluid Motors or Pumps, especially subclass 121.1 for a device of that class including an impeller which may comminute material passing therethrough.

#### **46.013 Under-sink garbage disposal:**

This subclass is indented under subclass 46.01. Apparatus for means to comminute kitchen food waste, which means is in series with the drain line of a sink.

- (1) Note. “Means for applying fluid to material” may comprise a sink faucet to which the disposal is attached, and need not be positively recited for classification herein.

#### **46.014 Having particular housing structure:**

This subclass is indented under subclass 46.013. Apparatus wherein significance is attributed to a particular housing construction, material, or feature (e.g., mounting means, journal bearing, sound insulation, or of particular housing material).

- (1) Note. A housing structure is considered “particular”, only if the particular feature is recited in a claim.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

285+, for comminutor housing structure not otherwise provided for.

#### **46.015 Provision to mount to sink:**

This subclass is indented under subclass 46.014. Apparatus wherein significance is attributed to the structure utilized in securing the apparatus to be supported, in use, by a kitchen countertop basin.

#### **46.016 Inlet provision:**

This subclass is indented under subclass 46.014. Apparatus including a positively recited passageway through which material to be comminuted enters the device from the sink, e.g., a strainer, splash guard, or cap.

- (1) Note. The “inlet provision” of this subclass may comprise means to (a) limit the maximum size of material entering the comminuting zone or (b) prevent material from coming out of the comminuting zone via the entrance.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

32.5, for a sink drain stopper having an interlock to prevent operation of a garbage disposal.

SEE OR SEARCH CLASS:

4, Baths, Closets, Sinks, and Spittoons, subclasses 286+ for a sink stopper, strainer, etc., per se.

#### **46.017 Striker having vertical axis:**

This subclass is indented under subclass 46.01. Apparatus including comminuting means comprising a striker having a vertical axis of rotation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

257, for a comminutor of the cooperating rotary type having a vertical axis wherein there is axial or radial flow of material.

**46.02** This subclass is indented under subclass 46.01. Apparatus including means to effect a translatory movement of material.

**46.04** This subclass is indented under subclass 46.01. Apparatus wherein the position of related components of the apparatus may be varied prior to or during a comminuting operation to accomplish a desired result.

**46.06** This subclass is indented under subclass 46.01. Apparatus provided with a plurality of elements which elements are so related in position and relative motion that coaction therebetween effect a material comminution operation.

**46.08** This subclass is indented under subclass 46.06. Apparatus wherein a striking element is movably secured to a rotary member which member generates an external force upon the element in such a manner that the element is urged against a cooperating surface with a blow-like effect which comminutes material caught therebetween.

**46.11** This subclass is indented under subclass 46.06. Apparatus wherein a stirring means turns upon an axis to create a turbulent motion of the liquid which motion generates a comminuting agitating force upon submerged material for its disintegration.

**46.13** This subclass is indented under subclass 46.06. Apparatus wherein a first member, moves with a to-and-fro motion relative to a second associated member which first and second members effect a comminuting action during such first member movement.

**46.15** This subclass is indented under subclass 46.06. Apparatus provided with a rolling member having a fixed or changeable axis which member engages a supporting surface or contacts like members for comminuting material collected therebetween.

**46.17** This subclass is indented under subclass 46.01. Apparatus wherein the cause of liquid excitement is a stirring means which turns upon an axis to create a turbulent motion of the liquid which motion generates a comminuting agitating force upon submerged material for its disintegration.

SEE OR SEARCH CLASS:

134, Cleaning and Liquid Contact With Solids, appropriate subclasses for similar type fluid agitating means in combination with a separate holding or handling device for solid materials or objects which are to be cleaned or contacted by fluid.

162, Paper Making and Fiber Liberation, appropriate subclasses for the agitation of a liquid containing fibrous material wherein some chemical or solvent action upon the fibrous material takes place.

366, Agitating, appropriate subclasses for the mixing and agitation of liquids or liquids combined with solids.

**47** This subclass is indented under subclass 38. Apparatus in which the applied fluid is a gaseous current which flows through the comminuting zone.

SEE OR SEARCH THIS CLASS, SUBCLASS:

39+, for fluid comminutors in which gas passes through the comminuting zone.  
60+, for apparatus in which fluid is applied to the material after it has been discharged from the comminuting zone.  
62, for apparatus in which fluid is applied to the material before it enters the comminuting zone.

SEE OR SEARCH CLASS:

406, Conveyors: Fluid Current, appropriate subclasses, for fluid current conveyors, per se.

**48** This subclass is indented under subclass 47. Apparatus in which gas that has left the comminuting zone is recirculated thereto..

(1) Note. The gas may undergo treatment of some form, i.e., heating, cooling, cleaning, etc., before being reapplied to the material or may be used to recirculate insufficiently comminuted material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

52+, for apparatus in which the oversize material, but not the gas current, is recirculated to the comminuting zone.

**49** This subclass is indented under subclass 47. Apparatus in which material suspended in a gaseous current is conveyed to a separating screen.

SEE OR SEARCH CLASS:

55, Gas Separation, subclasses 490+ and the subclasses which follow for separators of the screen type for separating solids from a gas current.

- 99, Foods and Beverages: Apparatus, subclass 528 for grain hulling apparatus having a screen and gas moving means.
- 209, Classifying, Separating, and Assorting, Solids, subclasses 21+, 250 and 318, for separators, per se, in which the material is conveyed by a gas current to a separating screen for separation into grades.
- 50** This subclass is indented under subclass 49. Apparatus in which the material is elevated to a screen by a fan member or members mounted on the comminutor drive shaft or on the shaft of a rotary comminuting element.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 56, for apparatus in which the fan is mounted on the comminuting element shaft but the material is not applied to a screen.
- 51** This subclass is indented under subclass 49. Apparatus in which the screen to which the material is applied forms a part of the surface against which the comminution takes place.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 83+, for apparatus including screen type comminuting members but which involve no fluid current.
- SEE OR SEARCH CLASS:
- 99, Foods and Beverages: Apparatus, subclasses 518+ for grain hullers in combination with fluid application which may have a perforated member therewith.
- 52** This subclass is indented under subclass 47. Apparatus in which means is provided to return to the comminuting zone oversize material which has been removed by the gas current.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 48, for such apparatus involving the return of the gas current to the comminuting zone.
- 80, for devices having means to return oversize to a comminutor from a non-fluid type separator.
- 53** This subclass is indented under subclass 52. Apparatus in which the gas is moved through the comminuting zone by suction applied above and coaxially of a comminuting member or members.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 58, for similar combinations in which no return flow means for the oversize is claimed.
- 54** This subclass is indented under subclass 47. Apparatus in which a rotary drum forms the comminuting zone through a substantial part of which passes a gas current which progresses in a generally horizontal direction.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 45, for apparatus in which a horizontal gas current passes through a succession of rotary drums or compartments of a single drum.
- 55** This subclass is indented under subclass 47. Apparatus in which the gas moving means is attached to a comminuting element or comprises the comminuting element itself.
- (1) Note. Comminuting elements provided with gas moving means are included herein.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 109, 185.5, 222, and 245, for discharge members attached to rotary comminuting elements which do not move at such a speed as to create an air current but merely move the material to a discharge opening.
- SEE OR SEARCH CLASS:
- 99, Foods and Beverages: Apparatus, subclass 530 for a grain huller having a gas-moving means integral therewith.

- 56** This subclass is indented under subclass 47. Apparatus in which the gas moving means is mounted on the same shaft with a rotary comminuting element.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 50, for such devices in which the gas moving means applies the material to a screen.
- SEE OR SEARCH CLASS:
- 99, Foods and Beverages: Apparatus, subclass 531 for a grain huller and gas mover coaxially separated.
- 57** This subclass is indented under subclass 47. Apparatus in which the gas is applied in a relatively localized area within the comminuting zone.
- 58** This subclass is indented under subclass 47. Apparatus in which the gaseous current through the comminuting zone is caused by the application of suction above and coaxially of at least one of the comminuting members.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 53, for apparatus as defined but in which provision is made for the return of oversize material to the comminuting zone.
- 56, for apparatus in which the suction is applied above and coaxially of the comminuting member by a gas moving means mounted on the same shaft.
- 59** This subclass is indented under subclass 47. Apparatus provided with means to control the flow of gas and/or through the comminuting zone.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 33, for automatic means to control the flow of gas.
- SEE OR SEARCH CLASS:
- 137, Fluid Handling, appropriate subclasses, particularly subclasses 594+ to 637+ for multiple valves.
- 209, Classifying, Separating, and Assorting Solids, subclasses 154 and 502, for gas flow control means in separators.
- 251, Valves and Valve Actuation, for valves, per se, for controlling gas flow.
- 60** This subclass is indented under subclass 38. Apparatus in which the fluid is applied subsequently to the comminuting operation.
- (1) Note. Many of the so-called amalgamating mills in which material leaving the comminuting zone is treated by a mercurial bath to separate the values are included in this subclass. Where the material is subjected to the separating action of a plate which has been coated with an amalgamating material, it was not considered, for purposes of this classification, to have been treated by a fluid, and these combinations have been classified with the other separator combinations in subclass 68.
- (2) Note. See HEATING, COOLING, OR DRYING MATERIAL and Lines With Other Classes of the class definition. Where the disclosed purpose of applying fluid subsequent to comminuting is for supporting combustion the combination is classifiable in Class 110.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 47+, for devices in which the fluid is applied both during the comminuting operation and subsequent thereto.
- SEE OR SEARCH CLASS:
- 99, Foods and Beverages: Apparatus, subclasses 518+ for a grain huller wherein fluid application may be subsequent to hulling.
- 209, Classifying, Separating, and Assorting Solid, subclasses 174+, for amalgamator separators, per se.
- 61** This subclass is indented under subclass 60. Apparatus in which at least a portion of the material is returned to the comminuting zone from the fluid application zone.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 10, for corresponding processes applied to cereal grains and the like.
- 52+, for apparatus in which material is removed from the comminuting zone by a gas current and is then recirculated to the comminuting zone.
- 80, for apparatus in which the oversize material from a nonfluid applying separator is recirculated to the comminuting zone.
- 62** This subclass is indented under subclass 38. Apparatus in which the fluid is applied prior to the comminuting operation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 8, for corresponding processes applied to cereal seeds and the like.
- 47+, for devices in which the fluid is applied both before and during the comminuting operation.
- 61, for devices in which the fluid is applied both subsequent to and prior to the comminuting operation.
- 63** This subclass is indented under the class definition. Apparatus provided with feed means, drive means and/or surface positioning means so inter-related that two or more of them may be controlled simultaneously by a single operating member.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 33+, for such devices embodying an automatic control.
- 100, for comminutors in which the drive therefor is controlled by the positioning of a receiving receptacle at the comminutor outlet.
- 135+, for inter-related feed devices for comminutors arranged for parallel flow of material.
- 145, for parallel roll mills having means to simultaneously position separate rolls by a single operator.
- 64** This subclass is indented under subclass 63. Apparatus limited to the simultaneous control of inter-related feed means and surface positioning means.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 34+, for such devices embodying an automatic control means.
- 65** This subclass is indented under the class definition. Apparatus provided with means to modify the temperature of the material being treated.
- (1) Note. The temperature modifying treatment may take place before, during, or after the comminution.
- (2) Note. See HEATING, COOLING, OR DRYING MATERIAL and Lines With Other Classes of the class definition of this class for notes to related art and for a statement of the lines followed with the various heating, cooling and drying classes.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 8, 17, 23, for processes involving comminution combined with steps of heating or cooling.
- 38+, for comminuting devices in which the temperature modification is effected by the application of a fluid to the material.
- SEE OR SEARCH CLASS:
- 34, Drying and Gas or Vapor Contact With Solids, for pertinent subclass(es) as determined by schedule review.
- 62, Refrigeration, particularly subclasses 320+.
- 100, Presses, subclass 92 for presses not elsewhere provided for, with means for heating, cooling or drying the material.
- 110, Furnaces, for pertinent subclass(es) as determined by schedule review.
- 126, Stoves and Furnaces, for pertinent subclass(es) as determined by schedule review.



- 165, Heat Exchange, appropriate subclasses for temperature modifying structure, per se.
- 219, Electric Heating, for pertinent subclass(es) as determined by schedule review.
- 432, Heating, for pertinent subclass(es) as determined by schedule review.
- 66** This subclass is indented under subclass 65. Apparatus in which the heating or cooling of the material is accomplished by means which modifies the temperature of a comminuting member.
- SEE OR SEARCH CLASS:
- 165, Heat Exchange, subclass 47 for a structurally installed heat exchange arrangement.
- 67** This subclass is indented under subclass 66. Apparatus in which the temperature of a moving comminuting element is modified by fluid within or carried by the element.
- SEE OR SEARCH CLASS:
- 72, Metal Deforming, subclasses 200+ for roll coolers and heaters in metal rolling mills.
- 100, Presses, subclasses 300+ for presses not elsewhere classified having heating or cooling means.
- 165, Heat Exchange, subclass 87 for a screw type impeller, and subclasses 92+ for a stirrer or scraper, with passages for heat exchange fluid.
- 68** This subclass is indented under the class definition. Apparatus provided with means to separate or classify the material undergoing treatment according to the physical characteristics of the parts separated.
- (1) Note. See SEPARATION OF MATERIAL and Lines With Other Classes of the class definition of this class for notes to related art and for a statement of the lines followed with the separating classes.
- (2) Note. Classification in this group is proper only if the separator consists of means other than the elements which effect the comminution. Where the separation is effected by the comminuting elements or a portion thereof, the patents have been classified elsewhere in the class. See, for example, subclasses 82, 83+ and 96.
- (3) Note. For purposes of this classification, where material is subjected to a plurality of successive separating operations, without an intermediate comminution, (e.g., where the material flows over and through a plurality of superposed screens) the operation is considered in its entirety as a single separation (i.e., separating zone) to obtain a plurality of grades.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 24.1+, for the corresponding process.
- 38+, for comminutors combined with separators which involve the application of a fluid to the material.
- 82, 83+ and 96 (see (1) Note above).
- SEE OR SEARCH CLASS:
- 96, Gas Separation: Apparatus, for apparatus for separating solids from gases, per se.
- 99, Foods and Beverages: Apparatus, subclasses 601+ for a grain huller that segregates diverse materials.
- 209, Classifying, Separating, and Assorting Solids, appropriate subclasses, and the notes thereto, for apparatus for separating solids into grades.
- 210, Liquid Purification or Separation, appropriate subclasses, and see the reference to Class 210 in References To Other Classes of the class definition of this class.
- 69** This subclass is indented under subclass 68. Apparatus in which the separating means comprises a screen or grating so arranged relative to the comminuting mechanism as to allow the discharge of sufficiently comminuted material during the comminuting operation, while the oversize material is retained within the comminuting zone for further treatment.
- (1) Note. The line maintained between this group and subclasses 79+ is that where the material has been fed to a screen

from the comminuting zone in such a way that a conveyor (other than the comminuting elements) would be necessary to return it to the zone, then the material has not been merely retained within the zone, as is necessary for this group, and the device is properly classifiable in subclasses 79+. However, where the arrangement is such that following treatment by the comminuting elements the material is so fed to the screen that the oversize is presented again to the comminuting elements by mere gravity flow or by action of the comminuting elements, then it is considered that the oversize has been merely "retained" as defined above, and such devices are classified here.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 49+, for discharge permitting screens associated with means to apply a fluid to the material to convey it to the screen.
- 83+, for comminutors provided with discharge permitting screens but in which the screen elements acts to accomplish at least a portion of the comminuting operation (see (1) Note under subclass 68).

SEE OR SEARCH CLASS:

- 209, Classifying, Separating, and Assorting Solids, subclasses 233+ and the notes thereto for sifters, per se.

- 70** This subclass is indented under subclass 69. Apparatus in which the discharge permitting screen forms a partition or end wall in a rotary comminuting drum.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 45, 105, 115, 137, and 153, for rotary comminuting drums provided with partitions which do not have a separating function.

- 71** This subclass is indented under subclass 70. Apparatus provided with a plurality of screening partitions or end walls.

- 72** This subclass is indented under subclass 71. Apparatus in which the material is presented to and flows past the plural partitions in succession.

- 73** This subclass is indented under subclass 69. Apparatus in which the screen is in the form of an arc which is concentric with the axis of rotation of a separate rotary comminuting member which cooperates with a member on which the arcuate screen is mounted.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 86+, and 90, for arcuate screens which cooperate with rotary comminuting members to assist in the comminuting operation.

- 74** This subclass is indented under subclass 69. Apparatus in which the discharge permitting screen takes the form of an annular screen which surrounds the comminuting zone or is mounted thereabove.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 50, for devices having such screens combined with elevating fan means to apply material thereto.

SEE OR SEARCH CLASS:

- 99, Foods and Beverages: Apparatus, subclasses 605+ for a grain huller having a cylindrical or conical perforated enclosure.

- 75** This subclass is indented under subclass 68. Apparatus in which the material flows (1) from a single comminuting zone in separate paths to a plurality of separators, (2) from a single separator in separate paths to a plurality of comminuting zones, or (3) in separate paths through a plurality of separating and comminuting zones, or any combination of features (1), (2) and (3).

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 41+, and 44, for such combinations involving the application of a fluid to the material.
- 74, for similar structures but in which screen partitions retain the material

within the comminuting zone until sufficiently reduced.

- 76** This subclass is indented under subclass 68. Devices in which the material flows alternately in succession through a plurality of distinct comminuting zones and distinct separating zones.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 11, for corresponding processes applied to cereal grains.
- 42, for such devices in which the separation involves the application of a fluid to the material.
- 72, for similar structures but in which the material is retained within the comminuting zones until sufficiently reduced.

- 77** This subclass is indented under subclass 68. Apparatus in which the material flows from one separator through a comminuting zone to another separator.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 41, for such devices in which the separation involves the application of a fluid to the material.
- 76, for the above defined combination provided with an additional comminutor or comminutor-separator combinations through which the material flows in series.

- 78** This subclass is indented under subclass 68. Apparatus in which the material flows from one comminuting zone through a separator to another comminuting zone.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 42, and 43+, for such combinations in which the separation involves the application of a fluid to the material.
- 76, for the above combination provided with additional separators or separator-comminutor combinations through which the material flows in series.

- 79** This subclass is indented under subclass 68. Apparatus in which the material flows from a comminuting zone to a separator.

- (1) Note. Classification in this subclass is proper only if the separation takes place in a zone that is so spaced from the comminuting zone that a conveying means would be necessary to return the material to the comminuting zone. For screen type separators wherein oversize material is retained in the comminuting zone, see subclasses 69+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 49+, and 60, for such combinations in which the separation involves the application of a fluid to the material.
- 76, 77 and 78, for the above combination provided with additional separators and/or comminutors through which the material flows in series.

- 79.1** This subclass is indented under subclass 79. Device provided with means to separate materials by electrostatic or magnetic attraction, differences in material densities, adherence to a surface, or by combination of material at the molecular level.

- 79.2** This subclass is indented under subclass 79. Device having a disintegrating member which revolves in an arc of at least 369° about a fixed axis, the device being provided with a perforated separating surface.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 185.5, through 197, 220+ and 277+, for rotary comminuting members not provided with material classifiers.

- 79.3** This subclass is indented under subclass 79.2. Device provided with a perforated separating surface which revolves about a fixed axis in an arc of at least 360°.

- 80** This subclass is indented under subclass 79. Apparatus in which material classified as oversize in the separator is conveyed back to the comminuting zone for retreatment.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 10, for corresponding methods applied to cereal grains.  
 52+, and 61+, for comminutor-separator combinations in which the oversize is returned to the comminuting zone but which involve the application of a fluid to the material.  
 69+, for devices where the material is retained within the comminuting zone until sufficiently reduced in size.  
 97, for comminutors combined with recirculation means.
- 81** This subclass is indented under subclass 68. Apparatus in which the material flows from a separator to a comminuting zone.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 62, for such combinations in which the separation involves the application of a fluid to the material.  
 76, 77 and 78, for the above combination provided with additional separators and/or comminutors through which the material flows in series.  
 96, for devices in which the comminuting surface or surfaces reject oversize material before passing to the comminuting zone.
- 82** This subclass is indented under the class definition. Apparatus provided with a chamber into which the material of certain characteristics is projected by the movement of the comminuting members and is thus prevented from passing to the comminuting zone.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 81, and the notes thereto for comminutors provided with means to separate material of certain characteristics from the feed to the comminutor, but in which the separator is distinct from the comminuting elements.
- SEE OR SEARCH CLASS:  
 209, Classifying, Separating, and Assorting Solids, subclass 642, for article sorters, per se, which involve the use of a thrower.
- 82.1** This subclass is indented under the class definition. Apparatus including a part having a shape that is generally cylindroidal, on the periphery of which is a ridge that circumscribes the cylindroid for a plurality of convolutions that are spaced from each other parallel to the centerline of the cylindroid, which part rotates within the confines of a casing and an element having a plurality of apertures that serve as passageways for the material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 246+, for a rotary propeller or screw feeding or discharge means.
- 82.2** This subclass is indented under subclass 82.1. Apparatus provided with means to change the size of the pieces of product that emerge from the passageways.
- 82.3** This subclass is indented under subclass 82.1. Apparatus wherein the surface provided with passageways is a curved surface.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 89.3, for a perforated concave surface without a claimed helical pusher.
- 82.4** This subclass is indented under subclass 82.1. Apparatus provided with a plurality of comminutors (e.g., knives) that turn about a common axis, and that act on the material in succession.
- (1) Note. The turning comminutors are in addition to the helical pusher.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 52+, for series material flow through plural comminuting zones.
- 82.5** This subclass is indented under subclass 82.1. Apparatus provided with a revolving comminutor (e.g., knife) which acts on the work

before the work goes through the openings in the perforated member.

**82.6** This subclass is indented under subclass 82.5. Apparatus wherein the casing which surrounds the cylindroidal part has an irregular interior surface (e.g., ribs) cooperating with such part.

**82.7** This subclass is indented under subclass 82.1. Apparatus provided with a revolving comminuter (e.g., knife) which acts on the work after it has passed through the passageways in the apertured element.

**83** This subclass is indented under the class definition. Apparatus in which at least a portion of the comminuting surface which is presented to the material to effect the comminution is provided with openings through the surface to permit the passage of sufficiently comminuted material therethrough to discharge it from the comminuting zone.

(1) Note. This group is meant to include only the surfaces which present completely bounded openings for the passage of material. Mere intermeshing comminuting surface characteristics are not included and are classified with the various types of comminutors below.

(2) Note. Patents directed to the subcombination of the apertured surface, per se, have been classified in this group on the basis of the disclosed combination.

(3) Note. See (2) Note to the definition of subclass 68.

SEE OR SEARCH THIS CLASS, SUBCLASS:

51, for comminutors provided with comminuting surfaces having openings to which material is borne by a gas current.

69+, for devices which permit the discharge of comminuted material during the comminuting operation, but in which the screen has no comminuting function.

SEE OR SEARCH CLASS:

100, Presses, subclasses 104+, for presses not elsewhere classified having drain means for expressed liquid.

209, Classifying, Separating, and Assorting Solids, subclasses 233+, 674, 675+, and 680+, for screens, sifters, and apertured members designed for the separation of solids into grades, but having no disclosed comminuting function.

210, Liquid Purification of Separation, subclasses 483+, particularly subclasses 498 and 499, for filter plates or screens.

**84** This subclass is indented under subclass 83. Apparatus in which the comminuting surface which is provided with the material passages cooperates with a comminuting surface or member which moves relative to it to effect comminution.

(1) Note. Loose grinding body comminutors (e.g., ball or rod mills) provided with perforated receptacles are included in this subclass since the grinding body was considered to present a moving comminuting surface which cooperates with the perforated receptacle. See this class, subclasses 170+, for loose grinding body comminutors with imperforate receptacles.

SEE OR SEARCH THIS CLASS, SUBCLASS:

91+, 94 and 95, for comminutors having perforated comminuting surfaces which cooperate with a stationary imperforate surface or directly with the material (single surface type).

198.1, for other comminutors having cooperating comminuting surfaces.

**84.1** This subclass is indented under subclass 84. Apparatus provided with members, (including shapes such as cylinders, spheres, parallelepipeds, tetrahedrons and/or mixed shaped), having free movement in the comminuting zone, and not having any fixed connection with other parts of the apparatus.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 137, for loose grinding bodies in plural comminuting zones with parallel material flow.  
 153, for loose grinding bodies in plural comminuting zones with series material flow.  
 170+, for a loose grinding body comminutor.
- 84.2** This subclass is indented under subclass 84. Apparatus wherein the perforated surface cooperates with a tool which has compound movement in the form of rotation about an axis passing through the tool and concurrent lateral movement relative to the perforated surface.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 201+, for compound movement comminutor not provided with a perforated surface.
- 84.3** This subclass is indented under subclass 84. Apparatus provided with a cooperating member which swings back and forth in an arc.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 94, for an oscillating perforated surface.  
 264+, for an oscillating comminutor not cooperating with a perforated surface.
- 84.4** This subclass is indented under subclass 84. Apparatus wherein the cooperating surface or member moves back and forth in a straight line.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 262+, for reciprocating cooperating comminuting surfaces not cooperating with a perforated surface.  
 283+, for a reciprocating comminuting surface.
- 85** This subclass is indented under subclass 84. Apparatus in which the screen comminuting surface has a rotary motion.
- SEE OR SEARCH CLASS:  
 209, Classifying, Separating, and Assorting Solids, subclasses 284 through 299, 301, and 304+, for rotating screens.
- 86** This subclass is indented under subclass 84. Apparatus in which the surface having openings cooperates with a rotary surface or member to effect the comminution.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 185.5, through 197, for similar devices which do not include a claimed surface having passages for the material.
- SEE OR SEARCH CLASS:  
 99, Foods and Beverages: Apparatus, subclasses 600+, for a grain hulling means that may leave cooperating rotating surfaces.
- 86.1** This subclass is indented under subclass 86. Apparatus wherein the rotary member hurls the work through space so that the work impacts the foraminous surface with sufficient force to comminute the work, or to contribute to the overall comminuting effect of the apparatus.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 47+, for devices having means to cause a gas flow in the comminuting zone.
- 86.2** This subclass is indented under subclass 86. Apparatus wherein the work contacting member is loosely joined to a revolving carrier (e.g., hub) so that the work contacting member is free to swing about a pivot as it is moved in a circular path by the carrier.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 193, for a striking member loosely mounted on a rotor.  
 194, for a striking member pivoted to a rotor.  
 201+, for compound movement comminutors not provided with a surface having discharge openings.

- 87** This subclass is indented under subclass 86. Apparatus in which the screen or elements thereof have some movement other than rotation during comminution.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 85, for devices in which the rotary striking member cooperates with a rotary surface having openings.  
 187, for such devices in which the rotary striking member cooperates with a movable member which is not a screen.
- 87.1** This subclass is indented under subclass 86. Apparatus wherein the rotor has projections which move past projections on the stator.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 191, for similar devices not provided with a comminuting screen.
- 88** This subclass is indented under subclass 86. Apparatus in which the screen surface is provided with projections or other characteristics which assist in effecting the comminution.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 235+, 242+, 260+, and 291+, for other comminuting elements provided with non-smooth surface characteristics.
- 88.1** This subclass is indented under subclass 88. Apparatus wherein the openings in the foraminous surface are defined, at least in part, by an acute margin of the surrounding surface portion.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 82.1+, for similar surfaces in devices provided with a helical pusher inside a tube.  
 273.1+, for comminuting surfaces having sharp edges, but not provided with discharge openings.
- 88.2** This subclass is indented under subclass 88. Apparatus provided with a nonporous comminuting surface in addition to the foraminous comminuting surface.
- SEE OR SEARCH CLASS:  
 99, Foods and Beverages: Apparatus, subclasses 605+ for a grain hulling device provided with both perforated and nonperforated surfaces.
- 88.3** This subclass is indented under subclass 88.2. Apparatus in which the material is subjected to a succession of at least three comminuting faces which are porous and nonporous by turns.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 152+, for devices in which the material is subjected to a series of comminuting operations.
- 88.4** This subclass is indented under subclass 88. Apparatus wherein the apertured surface includes a plurality of separated parallel elongated members.
- 89** This subclass is indented under subclass 86. Apparatus wherein the perforated surface is pivotally mounted or readily moveable to a dumping position.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 286+, for means to adjustably or yieldably mount normally stationary comminuting elements.
- 89.1** This subclass is indented under subclass 86. Apparatus in which the surface having openings, or portions thereof, is movable to change the size of the openings or its position relative to the comminuting member.
- 89.2** This subclass is indented under subclass 86. Apparatus wherein the perforated surface or parts thereof can be completely separated from the apparatus or the perforated surface is moved so a different part of said surface is in the comminuting zone.

**89.3** This subclass is indented under subclass 86. Apparatus wherein the stationary comminuting surface is an interior curved surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:

273.1, for a stationary curved surface provided with a plurality of points or punched out barbs, but not discharge openings.

**89.4** This subclass is indented under subclass 86. Apparatus wherein the discharge openings pass through a level, radially extending element that has a large surface area as compared with its thickness, and which surface remains immobile during comminution.

**91** This subclass is indented under subclass 83. Apparatus in which the material is presented to rotary comminuting surface provided with passages for the material.

(1) Note. Most of the devices in this subclass comprise perforated rotating screen drums in which the material is tumbled or devices in which the material is presented to a nonradial, nonperipheral face.

SEE OR SEARCH THIS CLASS, SUBCLASS:

70+, for such devices in which there is provided a screen in addition to the comminuting surface which prevents the discharge of oversize material.

85, for devices in which rotary surfaces having openings cooperate with a moving surface.

SEE OR SEARCH CLASS:

83, Cutting, appropriate subclasses relating to rotary cutters.

99, Foods and Beverages: Apparatus, subclasses 522, 603+ and 605+, for grain hullers having perforated surfaces.

144, Woodworking, subclasses 162.1+ for a wood slicer having similar structure.

209, Classifying, Separating, and Assorting Solids, subclasses 284 through 299, and 303+, for rotating drum sifters.

**92** This subclass is indented under subclass 91. Apparatus in which the face of the comminuting member, which is presented to the material, is generally in a radial plane relative to the axis of rotation of the member.

SEE OR SEARCH THIS CLASS, SUBCLASS:

85, for perforated radial comminuting surfaces which cooperate with a moving comminuting surface.

244+, and 278.1, for devices having imperforate radial comminuting faces.

SEE OR SEARCH CLASS:

99, Foods and Beverages: Apparatus, subclass 622 for a radial face grain hulling surface.

144, Woodworking, subclasses 118 and 176, for a similar device which functions to impart a shape to wood or like material.

**93** This subclass is indented under subclass 91. Apparatus in which the perforated rotating comminuting surface has the general shape of a cylinder and the material is presented to the outer periphery thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

85, for perforated peripheral comminuting surfaces which cooperate with a moving comminuting surface.

221+, 277, 279, and 280+, for such devices having imperforate peripheral comminuting surfaces.

SEE OR SEARCH CLASS:

83, Cutting, appropriate subclasses, particularly subclasses 331+ for a rotary flying cutter, and subclasses 355+ and 607+ for a cutter with simple revolving motion.

99, Foods and Beverages: Apparatus, subclasses 605+ and 639 for a perforated cylinder type grain huller and stemmer, respectively.

144, Woodworking, subclasses 117.1+, 172+ and 188, for a similar device which functions to impart a shape to wood and like material.



**94** This subclass is indented under subclass 83. Apparatus in which a comminuting surface which is provided with openings for the passage of material has reciprocating motion, i.e., traverses the same path and reverses its motion at the end of this path.

- (1) Note. The path may be rectilinear or curvilinear.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 95, and 274, for devices in which the material is given a reciprocating motion relative to a stationary comminuting surface.  
262+, for relatively reciprocating surfaces which cooperate to comminute the material.  
283, for reciprocating single surface comminutors having an imperforate comminuting surface.

SEE OR SEARCH CLASS:

- 144, Woodworking, subclasses 121+ and 182+, for a similar device for operating on wood and like material to impart a shape thereto.

**95** This subclass is indented under subclass 83. Apparatus in which a stationary comminuting surface is provided with openings for the passage of material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 145, for pencil-sharpening implements discharging debris through comminuting openings into a catch receptacle.  
274+, for stationary single surface comminutors in which the stationary member is imperforate.

SEE OR SEARCH CLASS:

- 30, Cutlery, subclasses 453+, for pencil-sharpening implements discharging debris through comminuting openings into a catch receptacle.  
99, Foods and Beverages: Apparatus, subclasses 518+ and 600+ for grain hullers that may have a perforated stationary hulling surface.

- 144, Woodworking, subclasses 120+, 175, and 190, for a similar device operating on wood or like material for imparting a shape thereto.

**96** This subclass is indented under the class definition. Apparatus in which the comminuting surface or surfaces are so arranged or have such characteristics that material of more than a given size is rejected by the surfaces before comminution.

- (1) Note. In the devices classified herein, the material which is rejected never reaches the comminuting zone as distinguished from the devices found in this class, subclasses 69+, in which the oversize material is prevented from leaving the comminuting zone after having been treated therein.  
(2) Note. Most of the devices classified here are clay grinders which reject the stones mixed in the clay.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 83+, for apertured comminuting elements which reject oversize material.

**97** This subclass is indented under the class definition. Apparatus provided with means to carry discharged material back to the comminuting zone to be retreated therein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 11, 13 and 29, for processes involving subjecting the material to a plurality of comminuting operations.  
48, for apparatus in which gas is recirculated to the comminuting zone.  
52+, and 61, for apparatus involving the application of a gas to the material in which the material is recirculated to the comminuting zone.  
69+, for apparatus in which the material is prevented from leaving the discharge zone until sufficiently comminuted.  
80, for apparatus in which material is recirculated between a separator and a comminuting zone.

## SEE OR SEARCH CLASS:

100, Presses, subclass 72 for presses not elsewhere provided for with means for recycling the compacted material.

- 98** This subclass is indented under the class definition. Apparatus combined with means to cause parts of the material undergoing treatment to move irregularly with respect to each other so as to cause them to commingle.

(1) Note. Agitators which merely assist in the feed or discharge and do not act to commingle the materials are excluded and will be found in the various feeding and discharging subclasses. Likewise, plows and the like for moving the material to and from the comminuting zone are excluded and will be found in the various comminutor groups. Agitation by the comminutor elements themselves is excluded, i.e., while the agitation and comminution may be coincident, the agitator elements must be distinct from the instrumentalities which effect the comminution. The material undergoing treatment by the agitator must be that which has been, will be, or is being treated in the comminutor. Comminutors combined with agitators which mix material other than that being comminuted are classified in subclasses 101.01+ of this class (241).

## SEE OR SEARCH THIS CLASS, SUBCLASS:

38+, for comminutors combined with means to apply a fluid to the material for agitation or other purposes.  
97, for agitators which act to recirculate material to the comminuting zone.

- 99** This subclass is indented under the class definition. Apparatus peculiarly adapted for breaking friable containers or a portion thereof to render them unfit for reuse or to recover the material from which they are made.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

84, 94, 262+, and 283, for comminuting devices having reciprocating comminuting members.

185.5, through 197, for comminutors in which material is subjected to blows by rotary striking members.

## SEE OR SEARCH CLASS:

100, Presses, appropriate subclasses, for patents to a device for crushing hollow metal bodies (containers, car bodies, etc.) and disclosed as also capable of breaking bottles.  
169, Fire Extinguishers, subclass 58 for automatic system of that class comprising a frangible container, and subclasses 80 and 83 for portable vessels provided with means therein to break a chemical containing bottle.

- 100** This subclass is indented under the class definition. Apparatus provided with (1) a detachable receiver for the material discharged from the comminutor, or (2) means on the comminutor adapted to engage a removable receiver for the material.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

82, for detachable receivers for material separated by projection from the remainder.

## SEE OR SEARCH CLASS:

62, Refrigeration, subclasses 320+ for the combination of a comminutor with a receiver where the latter is claimed as means for utilizing a refrigerant.  
141, Fluent Material Handling, With Receiver or Receiver Coating Means, subclasses 11+ and 69+ for devices for filling separable receivers, combined with means to subject the material to some treatment other than comminution.

**101.01 Combined or convertible:**

This subclass is indented under the class definition. Apparatus in which the means for comminuting the material is (a) combined with apparatus for another purpose not provided for above, or (b) in which a part is relatively movable or interchangeable in order to convert the apparatus to another apparatus either within or outside the class definition.

- (1) Note. The combined feature of clause (a) is in addition to:

(1.) the necessary drive or static mounting means for the comminutor;

(2.) means for controlling the flow of material to, through, or from the comminuting zone

(3.) an additional comminuting device within the comminuting zone,

(4.) means for retaining material within the comminuting zone or for returning escaped material thereto

(5.) means for cleaning a comminuting surface

(6.) means to balance a comminuting element; or

(7.) means to lubricate the comminutor.

See the Search This Class, Subclass notes below for subclass references.

SEE OR SEARCH THIS CLASS, SUBCLASS:

109, 135+, 171, 185.5+, 202, 222+, 245, 265, or 271 for examples of means for controlling the flow of material to, through, or from the comminuting zone.

104, 105, 108, 115, 134, and 152.1+, for examples of an additional comminuting device within the comminuting zone, (e.g., subclasses ).

46.016, 119, 124, and 226, for examples of means for retaining material within the comminuting zone or for returning escaped material thereto.

112, 166+, for examples of means for cleaning a comminuting surface

285.1+, for examples of the necessary drive or static mounting means for the comminutor.

292, for examples of means to balance a comminuting element.

- (2) Note. In this subclass, for example, is a comminuting device combined with signaling or indicating means; inspection means; ambulant supporting means; material handling means other than necessary to feed material to or remove material from the comminuting zone; means to compress, cut, mold, or otherwise shape the material prior to comminution; sampling means; vacuumizing means; huller or sheller for seeds; container opener; blade sharpener; or agitating means for material other than that being comminuted.

- (3) Note. All preceding subclasses must be investigated for particular combinations within this definition but which are specifically provided for above.

- (4) Note. See the notes to the class definition for the combination of a comminutor with other apparatus provided for in other classes.

**101.1** Apparatus under subclasses 101.01+ which parts are relatively movable or interchangeable in order to convert the apparatus for some other purpose.

**101.2** Apparatus under subclasses 101.01+ including comminutors with features other than the comminuting structure.

- (1) Note. See (1) Note of subclass 101.01 for noncomminuting means provided for in this class (241).

SEE OR SEARCH THIS CLASS, SUBCLASS:

46.012, for a comminutor combined with a dishwasher.

**101.3** This subclass is indented under subclass 101.2. Apparatus having means to provide information relating to the operation of the machine, or relating to a characteristic (e.g., size or weight) of the material either before or after comminution.

## SEE OR SEARCH CLASS:

73, Measuring and Testing, appropriate subclasses, for measuring and testing devices not combined with a comminutor.

- 101.4** This subclass is indented under subclass 101.2. Apparatus having means (other than of the class type) to change the physical form of the material before comminution (e.g., cutting).

## SEE OR SEARCH THIS CLASS, SUBCLASS:

152.1+, for a series of comminuting zones of the class type.

## SEE OR SEARCH CLASS:

83, Cutting, appropriate subclasses, for cutting devices not combined with comminutors.

- 101.5** This subclass is indented under subclass 101.2. Apparatus having means to move the work or the product except directly to or from the comminuting zone.

## SEE OR SEARCH CLASS:

111, Planting, subclasses 8+, 34+, and 130+, for mechanisms for planting seeds, etc., at intervals.

- 101.6** This subclass is indented under subclass 101.5. Apparatus provided with means to blend two or more substances, one comminuted and one not comminuted by the apparatus.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

98, for devices having means other than the comminutor to agitate the comminuted material.

101.8, for a mill combined with a mixer.

## SEE OR SEARCH CLASS:

366, Agitating, particularly subclasses 152.1+, 160.1+, 162.1+, and 177.1+ for mixing of plural substances, per se.

**101.71 With support vehicle:**

This subclass is indented under subclass 101.2. Apparatus wherein the comminuting apparatus is mounted on a movable carrier (e.g., a vehicle with wheels).

## SEE OR SEARCH CLASS:

280, Land Vehicles, for ambulant supporting apparatus not combined with a comminutor.

**101.72 Having extendable, comminutor-supporting arm:**

This subclass is indented under subclass 101.71. Apparatus including a comminutor mounted on the support vehicle for manipulation by a support member that is mounted for movement outwardly from the vehicle.

- (1) Note. The arm of this subclass may be comprised of multiple links pivotally connected to each other or comprised of aligned segments mounted to slide past each other.

**101.73 Reciprocating surface-type comminutor:**

This subclass is indented under subclass 101.72. Apparatus wherein the comminutor is of the type that functions by the action of a work engaging member that moves from a starting point to traverse a path and reverses motion at the end of the path to move therealong in the opposite direction to the starting point.

**101.74 Self-propelled vehicle:**

This subclass is indented under subclass 101.71. Apparatus wherein the vehicle includes means that cause the vehicle to move over the earth.

**101.741 Refuse support vehicle:**

This subclass is indented under subclass 101.74. Apparatus wherein the vehicle is particularly adapted to haul domestic waste from a pickup point to a disposal center.

**101.742 Self-loading from ground:**

This subclass is indented under subclass 101.74. Apparatus including a provision to receive the material being comminuted or disintegrated directly from the earth over which the vehicle is propelled.

**101.75 Detachable from propelling vehicle:**

This subclass is indented under subclass 101.71. Apparatus intended to be removably secured to another vehicle, which other vehicle includes means to apply thrust to the earth to cause the comminutor-supporting vehicle to move thereover.

**101.76 From rear:**

This subclass is indented under subclass 101.75. Apparatus wherein the comminutor-supporting vehicle is intended to be pulled behind the propelling vehicle.

**101.761 Tub grinder:**

This subclass is indented under subclass 101.76. Apparatus including a hopper structure, for containing material to be comminuted, comprised of a bottom portion having an opening allowing passage of the material to the comminuting means and a cylindrical wall portion extending upwardly from the bottom that turns about its axis causing the material to move to the opening in the bottom portion.

**101.762 Operated while propelled:**

This subclass is indented under subclass 101.76. Apparatus intended to comminute or disintegrate material while being transported.

**101.763 Self-loading from ground:**

This subclass is indented under subclass 101.762. Apparatus including a provision to receive the material being comminuted or disintegrated directly from the earth over which the vehicle is propelled.

**101.77 From front:**

This subclass is indented under subclass 101.75. Apparatus wherein the comminutor-supporting vehicle is intended to be pushed ahead of the propelling vehicle.

**101.78 Manually propelled:**

This subclass is indented under subclass 101.71. Apparatus intended to receive thrust from a human to cause the comminutor-supporting vehicle to move over the earth.

**101.8 With mixer:**

This subclass is indented under subclass 101.2. Apparatus combined with apparatus for intermixing one material to another in a zone separate from the comminution zone.

- (1) Note. The materials can be mixed together either before or after comminuting. Further, the apparatus for comminuting and that for mixing can be structurally integral or separate.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 101.1, for apparatus that is convertible between a mill and a mixer.  
101.6, for a comminutor provided with apparatus to blend two or more substances, one of which is comminuted and one of which is not comminuted.  
152.1+, for apparatus having plural serially connected zones for performing the same type function.  
604, for an art collection including a comminutor having plural inlets for diverse solid materials.

SEE OR SEARCH CLASS:

- 366, Agitating, for mixing apparatus, *per se*.

**102**

This subclass is indented under the class definition. Apparatus in which the comminuting surface is resilient or is constructed in sections so that parts thereof are deformable relative to other parts of the surface by contact with the material in the normal operation of the device.

- (1) Note. These devices normally operate to comminute one ingredient of a mixture of materials more extensively than one or more other ingredients of the mixture.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 14, for processes involving the use of devices of this type for the selective comminution of mixed materials.

SEE OR SEARCH CLASS:

- 99, Foods and Beverages: Apparatus, subclasses 600+ for grain hullers having similar characteristics.

**103** This subclass is indented under the class definition. Apparatus in which rolling members which effect the comminution are mounted in contact with a plurality of relatively moving surfaces so as to be frictionally driven thereby and at least one of the surfaces forms the support for the roller members.

- (1) Note. These devices are commonly referred to as “ball chasers”.
- (2) Note. For the most part, the devices herein are provided with a plurality of roller members, but those including only a single roller are found in this group.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

107+, for similar devices in which a plurality of rollers are supported by means other than one of the frictional drive surfaces.

173+, for similar devices in which rolling comminuting bodies are moved relatively to a receptacle by pusher members rather than being frictionally driven between relatively movable surfaces.

**104** This subclass is indented under subclass 103. Apparatus in which the devices provided for in this group is combined with another diverse type of comminutor.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

105, for devices which include a plurality of comminuting zones, each being of the type provided for in this group.

108, 115+, 134+, and 152.1+, and the notes thereto for other plural comminutor combinations.

**105** This subclass is indented under subclass 103. Apparatus embodying a plurality of comminuting zones of the type provided for in this group.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

108, 115+, 134+, and 152.1+, and the notes thereto for other plural comminutor combinations.

**106** This subclass is indented under subclass 103. Apparatus in which one of the frictional drive surfaces rotates about a horizontal axis.

**107** This subclass is indented under the class definition. Apparatus in which a plurality of rotary or oscillatory surfaces cooperate with the same portion of another surface so as to comminute material.

- (1) Note. In the titles and definitions below, the term “plural surfaces” has been used to denote the plural rotary or oscillatory surfaces, and the term “common surface” to denote the single surface, or portion of a surface with which the plural surfaces cooperate.

- (2) Note. In general, those devices in which a plurality of surfaces are mounted rigidly (sectional surfaces) to rotate about a single axis have not been considered to present plural surfaces to the common surface and have been classified as if a single surface were so presented. If the plural surfaces are adapted to move relative to the axis during comminution they have been included in this group. An exception to this rule was made in the case of devices in which a unitary member carries a plurality of striking members which cooperate with another surface. These have been considered to present a single surface and have been classified as impact mills for which see this class, subclasses 185.5-197.

- (3) Note. The plurality of rotary or oscillatory surfaces in the devices of this group must be mounted so as to be restricted in their movement. See this class, subclass 170, for devices in which a plurality of loose comminuting bodies cooperate with a common surface to effect the comminution.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

74, for chasers provided with an annular screen surrounding the comminuting zone to prevent the discharge of uncomminuted material.

- 79+, for chasers in which the common surface is provided with an annular perforated extension thereof to separate the material.
- 83+, for chasers in which one or more of the comminuting elements are perforated.
- 103+, for ball chasers in which rolling members are supported and driven by surfaces common to all of the rolling members.
- 198.1, for cooperating surface comminutors in which a single surface which cooperates with another surface may have a movement corresponding to some of the motions of the plural surfaces provided for in this group.
- SEE OR SEARCH CLASS:  
68, Textiles: Fluid Treating Apparatus, subclasses 108+, for chasers applied to textile treatment.
- 108** This subclass is indented under subclass 107. Apparatus provided with an additional comminutor not of the type included within this group.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
104, 134+ and 152.1+, for other plural diverse type comminutors.  
115+, for plural comminutors of the type provided for in this group.
- 109** This subclass is indented under subclass 107. Apparatus provided with mechanism for primarily presenting material to the comminuting zone or for controlling the flow of material thereto.
- (1) Note. The term "mechanism" is intended to denote means in addition to gravity for positively effecting the feed. The feeding must be an operation other than the mere comminuting movement of the comminuting surfaces.
- (2) Note. The various feeding and/or discharging subclasses of this class for feeders and/or dischargers in combination with other types of comminutors. Where no feeding and/or discharging group was provided, the patents were classified with the particular comminutor combination claimed.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
301, for feeders and/or dischargers combined with comminutors where the latter was claimed so broadly as to fail to present a basis for classification in a specific comminutor group.
- SEE OR SEARCH CLASS:  
198, Conveyors: Power-Driven, for feeders and dischargers involving the use of conveyors, per se.  
221, Article Dispensing, appropriate subclasses for articles dispensers not otherwise classified, per se.  
222, Dispensing, appropriate subclasses for fluent material dispensers, per se.  
414, Material or Article Handling, for the generic subject matter of material handling, per se.
- 110** This subclass is indented under subclass 107. Apparatus in which the plural surfaces have movement across the common surface in addition to their rotary motion.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
203, for arrangements in which a single surface has planetary motion relative to another surface and also moves across it.
- 111** This subclass is indented under subclass 107. Apparatus in which the outer peripheral surface of the moving common surface cooperates with the plural surfaces to effect the comminution.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
143+, 159 and 227+, for other devices in which the peripheral portions of rotary surfaces cooperate to effect the comminution.
- SEE OR SEARCH CLASS:  
68, Textiles: Fluid Treating Apparatus, subclass 100, for similar devices used in treating textiles.

- 100, Presses, subclasses 104+ for presses not elsewhere classified having drain means for expressed liquid.
- 112** This subclass is indented under subclass 111. Apparatus in which at least one of the cooperating surfaces is provided with a scraper or other cleaner.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 167, for cleaners or scrapers for roll members in other comminutors.
- SEE OR SEARCH CLASS:
- 15, Brushing, Scrubbing, and General Cleaning, subclass 256.5 and the notes thereto for cleaners and scrapers for moving comminuting elements in which no claim is made to significant comminuting features.
- 113** This subclass is indented under subclass 107. Apparatus in which the plural surfaces cooperate with each other as well as the common surface to perform the comminuting function.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 111+, for devices in which the plural surfaces cooperate with the outer periphery of the common surface and in addition cooperate with each other.
- 143+, 158+ and 227+, for other devices embodying plural roll members which cooperate to comminute.
- 170+, for devices in which a plurality of loose comminuting bodies cooperate with each other and a common surface to effect the comminution.
- 114** This subclass is indented under subclass 107. Apparatus in which the plural surfaces rotate about their own axes and present radial faces to the common surface.
- (1) Note. The term “radial face” is meant to denote that plane perpendicular to the axis of rotation of the member.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 244+, for devices in which a single rotary member presents a radial face to another surface, particularly subclasses 252 and 254, for those in which the cooperating members are not coaxial.
- 115** This subclass is indented under subclass 107. Apparatus in which there is provided a plurality of sets of plural surfaces, each of which sets cooperates with a different common surface or with a different portion of the same surface.
- (1) Note. The material may flow in series from one comminuting zone to the next or in series-parallel or through parallel paths through independent zones.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 104, and 108, for devices in which a comminutor, providing plural surfaces cooperating with a common surface, is combined with another type of comminutor.
- 105, for similar devices providing for a plurality of comminuting zones of the type in which plural rolls are frictionally driven and supported by relatively moving surfaces.
- 118, and 125, for devices providing a plurality of sets of plural surfaces but in which the sets cooperate with the same common surface or the same portion thereof.
- 134+, and 152.1+, for devices having plural comminuting zones of the other types.
- 116** This subclass is indented under subclass 115. Apparatus in which at least two of the plural surfaces of different sets are coaxial, are spaced radially of the common surface axis, and are arranged on the same side thereof.
- 117** This subclass is indented under subclass 107. Apparatus in which the common surface has movement during the comminuting operation.
- (1) Note. The common surface movement is simple rotation about a single axis in most cases.



- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 172+, for comminutors in which a loosely supported roller is guided for movement relative to a moving surface.  
 228, for devices in which a single rotary comminuting surface cooperates with an internal rotary comminuting surface.
- SEE OR SEARCH CLASS:  
 68, Textiles: Fluid Treating Apparatus, subclass 108, for chasers having movable beds utilized in the treatment of textiles.
- 118** This subclass is indented under subclass 117. Apparatus in which the plural surfaces have rotary motion about a plurality of axes.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 123+, for planetary movement plural surfaces cooperating with a stationary surface.  
 206, for devices embodying a single compound movement surface cooperating with a moving surface.
- 119** This subclass is indented under subclass 117. Apparatus provided with means to move the material within the comminuting zone or to discharge it therefrom. The means usually takes the form of a movable or stationary plow member.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 112, and 166+, for rotating member scrapers in other types of comminutors.  
 124, for similar devices in which the plural surfaces have planetary movement and the common surface is stationary.
- SEE OR SEARCH CLASS:  
 15, Brushing, Scrubbing, and General Cleaning, subclasses 256.5+, for moving surface scrapers of general application.  
 222, Dispensing, appropriate subclasses, for subcombinations comprising means to discharge material from rotating members.
- 120** This subclass is indented under subclass 117. Apparatus in which at least one of the plural surfaces has a drive means which imparts to it a positive rotation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 126, for positively driven plural surfaces which have planetary motion and cooperate with a stationary common surface.
- 121** This subclass is indented under subclass 117. Apparatus in which the plural surfaces are so mounted as to be forcible away from the common surface by the material under abnormal conditions.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 127+, for devices embodying plural surfaces having planetary motion which are forcible away from the common surface.  
 230+, and 238, for yieldably mounted single rotary surfaces.
- 122** This subclass is indented under subclass 121. Apparatus in which the common surface rotates on a substantially horizontal axis.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 228, for similar devices having a single rotary surface cooperating with an outer surface rotating on a horizontal axis.
- 123** This subclass is indented under subclass 107. Apparatus in which the plural surfaces have rotary motion about a plurality of axes.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 118, for devices having these characteristic but in which the common surface has movement during comminution.  
 207+, for devices provided with single surfaces which have planetary movement.

- SEE OR SEARCH CLASS:  
68, Textiles: Fluid Treating Apparatus, subclass 98, for planetary movement rolls for treating textiles.
- 124** This subclass is indented under subclass 123. Apparatus provided with means for moving material within the comminuting zone or discharging it therefrom. The means usually takes the form of a plow member moving with the plural surfaces.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
119+, for devices having these characteristics but in which the common surface has movement during comminution.
- SEE OR SEARCH CLASS:  
222, Dispensing, appropriate subclasses, for subcombinations comprising means to unload receptacles.
- 125** This subclass is indented under subclass 123. Apparatus in which the plural surfaces have movement about more than two axes.
- 126** This subclass is indented under subclass 123. Apparatus in which at least one of the plural surfaces is provided with a drive means to impart to it a positive rotation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
120, for devices having these characteristics, but in which the common surface moves during comminution.
- 127** This subclass is indented under subclass 123. Apparatus in which the plural surfaces are mounted so as to be forcible away from the common surface by the material under abnormal conditions.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
121+, for devices in which a moving common surface cooperates with plural surfaces mounted for forced movement.
- 128** This subclass is indented under subclass 127. Apparatus in which the plural surfaces are pivotally mounted for movement toward and away from the common surface.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
232+, for devices having pivotally mounted rotary surfaces which cooperate with another rotary surface.
- 129** This subclass is indented under subclass 128. Apparatus in which the rotary motion of the plural surfaces centrifugally urges them toward contact with the common surface.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
122, for devices having these characteristics in which the common surface rotates about a horizontal axis.  
131, for such devices in which the plural surfaces are not pivotally mounted.
- 130** This subclass is indented under subclass 129. Apparatus in which the centrifugally urged plural surfaces are provided with means to modify the centrifugal force. The means usually takes the form of a spring mounted to augment or lessen the centrifugal force.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
122, for devices having these characteristics in which the common surface rotates about a horizontal axis.  
132, for nonpivotally mounted surfaces provided with means to urge them into contact with the common surface.
- 131** This subclass is indented under subclass 127. Apparatus in which the rotary motion of the plural surfaces centrifugally urges them toward contact with the common surface.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
129+, for such devices in which the plural surfaces are pivotally mounted.
- 132** This subclass is indented under subclass 127. Apparatus having any means (such as pressure applying mechanism, springs, added dead

weights, weight receiving receptacles, etc.) in addition to the weight of the plural surfaces for urging the surfaces toward contact with the common surface.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 122, for plural surfaces spring urged against a common surface which rotates on a horizontal axis.
- 130, for pivotally mounted plural surfaces having spring or the like means for modifying the centrifugal force which urges the surfaces toward contact with the common surface.

- 133** This subclass is indented under subclass 127. Apparatus in which the plural surfaces are so mounted as to be forcible away from the common surface independently of each other.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 122, for devices in which the plural surfaces are independently forcible away from a common surface which rotates on a horizontal axis.
- 128+, for devices in which the plural surfaces are pivotally mounted to be independently forcible away from the common surface.

- 134** This subclass is indented under the class definition. Apparatus in which there is provided a plurality of comminuting zones through which the material flows in parallel paths.

- (1) Note. Devices in which the material flows serially and also in parallel paths through plural comminuting zones are to be found in this group. Where the flow is solely from one comminuting zone to another in succession, the patents have been placed in subclasses 152.1+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 42, and 44, for devices including fluid applying means in connection with means for causing parallel material flow through plural comminuting zones.

- 75, for devices in which the material passes through plural comminuting and separating zones in parallel.

- 104, 105, 108, and 115+, for comminutors of the type there provided for arranged for parallel material flow.

- 135** This subclass is indented under subclass 134. Apparatus provided with (1) a single or unitary mechanism to feed the material to the plural zones or a unitary control for the flow of material to the zones, or (2) plural mechanisms or controls which are interconnected to feed material to the plural zones or control the feed thereto.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 34+, for automatically controlled feed means and the various feeding subclasses in this class and the notes thereto for nonautomatic feeders combined with comminutors.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, appropriate subclasses for conveyors, per se.
- 221, Article Dispensing, subclasses 92+ for devices which feed articles from plural sources and particularly subclass 133 where such devices feed to common discharge outlet.
- 222, Dispensing, appropriate subclasses, particularly subclasses 129, 265 and 478.

- 136** This subclass is indented under subclass 135. Apparatus in which the feed mechanism comprises plural interconnected means for forcing material against a moving comminuting surface or surfaces.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 34+, for interconnected feed devices of this type combined with automatic control features for the feed.
- 151, for single surface comminutors with plural comminuting zones provided with feed devices which are not interconnected.
- 274+, 277+ and 283, for single surface comminutors, per se.

- 137** This subclass is indented under subclass 134. Apparatus in which all of the comminuting zones are of the type in which the comminution is effected by a loose grinding body or bodies.
- (1) Note. This subclass includes partitioned receptacles provided with loose comminuting bodies wherein the material passes in parallel through separate portions of the receptacle, and in which the partition is sufficiently extensive to create distinct comminuting zones.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 153, for such devices where the material flows from one comminuting zone to the other in series.  
 170+, for single comminutors of this type.
- 138** This subclass is indented under subclass 134. Apparatus in which all of the comminuting zones are of the rotary striking member type, i.e., a rotary member strikes the material a sudden blow.
- (1) Note. This subclass may include devices in which a plurality of striking members carrying rotors cooperate with each other, if each rotor acts to comminute material independently of the other. If there is no such independent function and the comminution is due solely to the cooperation of the rotors, proper classification is in subclass 187.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 154, for rotary striking member comminutors arranged for serial flow of material.  
 185.5, through 197, and the notes thereto, for single rotary striking member comminutors.
- 139** This subclass is indented under subclass 134. Apparatus in which all of the comminuting zones are the type in which the comminution is effected between cooperating surfaces.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 155+, for such plural comminutors arranged for series flow of material.  
 198.1, for single comminutors of this type.
- 140** This subclass is indented under subclass 139. Apparatus in which all of the comminuting zones employ cooperating surfaces at least one of which has compound movement, i.e., a movement which is the sum of several simpler motions.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 156, for compound movement type comminutors arranged for serial flow of material.  
 201+, for single compound movement type comminutors.
- 141** This subclass is indented under subclass 139. Apparatus in which all of the comminuting zones involve the use of cooperating surfaces at least one of which rotates.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 157+, for such comminutors arranged for series flow of material.  
 220+, for single comminutors of this type.
- 142** This subclass is indented under subclass 141. Apparatus in which all of the comminuting zones are of the type in which the material flows circumferentially or tangentially of the rotary surface during comminution.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 158+, for such devices arranged in series.  
 221+, for single comminutors of this type.
- 143** This subclass is indented under subclass 142. Apparatus in which all of the cooperating surfaces of each comminuting zone rotate relative to each other to comminute the material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 159, for such devices arranged for series flow of material.

- 227+, for single comminutors in which both cooperating surfaces rotate.
- 144** This subclass is indented under subclass 143. Apparatus in which a rotary surface of one of the comminuting zones is coaxial with a rotary surface of another comminuting zone.
- 145** This subclass is indented under subclass 143. Apparatus in which a single operator member adjusts or positions simultaneously surfaces of separate comminuting zones.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 63+, for devices having inter-related, feed, drive and surface positioning means.  
 230, for devices including means to adjust the rotary surfaces of a single comminuting zone.
- 146** This subclass is indented under subclass 141. Apparatus in which the material flows axially and/or radially of a rotary comminuting surface during the comminuting operation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 161+, for such devices arranged for series flow of material.  
 244+, for single comminutors of this type.
- 147** This subclass is indented under subclass 139. Apparatus in which all of the comminuting zones employ cooperating surfaces which have relative reciprocation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 164, for reciprocating surface comminutors arranged for serial flow of material.  
 262+, for single reciprocating surface type comminutors.
- 148** This subclass is indented under subclass 147. Apparatus in which the reciprocating surface has an oscillating movement.
- (1) Note. For reference to the definition of oscillating type comminutors, see the Search This Class, Subclass, references below.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 164, for oscillating type comminutors arranged for serial flow of material.  
 264+, for single oscillating type comminutors see note (1) above.
- 149** This subclass is indented under subclass 147. Devices in which the reciprocation of the moving surfaces is in a vertical straight-line path.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 165, for plural devices of this type arranged for series flow of material.  
 270+, for single devices of this type.  
 291, for plural mortar arrangements, per se.
- SEE OR SEARCH CLASS:  
 384, Bearings, subclasses 7+, for linear bearings for plurality of reciprocating stamp stems and no significant comminutor structure claimed.
- 150** This subclass is indented under subclass 149. Apparatus in which there is provided three or more vertically reciprocating surfaces arranged in an annulus.
- SEE OR SEARCH CLASS:  
 74, Machine Element or Mechanism, subclasses 56+, for axial cam devices for actuating vertically reciprocating members.
- 151** This subclass is indented under subclass 134. Apparatus in which all of the comminuting zones are of the type in which material is presented to a single comminuting surface.
- (1) Note. A comminutor in which a plurality of distinct columns of material are fed against a common surface for comminution thereby was considered to present a plurality of comminuting zones in parallel.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 136, for plural comminutors of this type provided with interconnected feed devices.

- 152.1+, for devices of this type arranged for series flow of material.  
 274+, 277+ and 283, for single comminutors of the defined type.

**152.1 Series material flow only through plural comminuting zones:**

This subclass is indented under the class definition. Apparatus in which the material is fed in succession to a plurality of comminuting zones to be treated in series by the comminutors.

- (1) Note. Where the comminuting zones were so closely related that there was difficulty in determining whether a plurality of zones or a single zone was involved, the line followed was that if there was a substantial cessation of the comminuting operation between separate zones, the patent was classified as a plural device and will be found herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 29, for the process of subjecting material to a plurality of successive comminuting operations.  
 42, for means applying fluid to same material at a plurality of spaced points within plural comminuting zones.  
 43+, for means applying fluid to material within plural distinct comminuting zones.  
 76, for means for comminuting with means for separating or classifying material with series material flow through plural alternate comminuting zones.  
 78, for means for comminuting with means for separating or classifying with a separator interposed between plural comminuting zones.  
 80, for means for comminuting with means for separating or classifying having a separator in the discharge from the comminuting zone and having an oversize return to the comminuting zone.  
 82.4, for a comminuting means including a helical pusher inside a tube which moves material toward a perforated member, with a series of axially aligned rotary knife blades.

- 104, for rolls frictionally driven and supported by relatively moving surfaces and additional diverse type comminutor.  
 105, for rolls frictionally driven and supported by relatively moving surfaces with plural comminuting zones.  
 108, for plural rotary or oscillatory surfaces cooperating with a common surface and a diverse type comminutor.  
 115+, for plural sets of rotary or oscillatory surfaces cooperating with plural common surfaces.

**152.2 Diverse type comminuting zones:**

This subclass is indented under subclass 152.1. Apparatus in which the plural zones are adapted to comminute in diverse manners.

- 153** This subclass is indented under subclass 152.1. Apparatus in which all of the comminuting zones are of the type in which the comminution is effected by a loose grinding body or bodies.

- (1) Note. This subclass includes partitioned receptacles provided with loose grinding bodies in which the material passes from one portion of the receptacle to another in series and in which the partition is sufficiently extensive to create distinct comminuting zones.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 70+, for partitioned rotary ball or rod mills in which the partition is provided with apertures for the passage of material.  
 137, for such devices where the flow of material is parallel or series-parallel.  
 170+, for single comminutors of this type.

- 154** This subclass is indented under subclass 152.1. Apparatus in which all of the comminuting zones are of the rotary striking member type.

- (1) Note. For the definition of rotary striking member comminutors, see the definition of subclasses 185.5-197 of this class (241).  
 (2) Note. This subclass may include devices in which a plurality of striking member carrying rotors cooperate with each other, if each rotor acts to comminute

material independently of the other. If there is no such independent function and the comminution is due solely to the cooperation of the rotors, proper classification is in subclass 187.

SEE OR SEARCH THIS CLASS, SUBCLASS:

138, for rotary striking member comminutors arranged for parallel or series-parallel flow of material.

185.5, through 197, for single rotary striking member comminutors.

**155** This subclass is indented under subclass 152.1. Apparatus in which all of the comminuting zones are the type in which the comminution is effected between cooperating surfaces.

- (1) Note. In general, where a plurality of relatively movable surfaces cooperate with a single surface so as to treat the material serially, the device was considered to present plural comminuting zones and has been classified in this group. See the note to subclass 160 for an exception to this rule.

SEE OR SEARCH THIS CLASS, SUBCLASS:

139+, for such devices arranged in parallel or series-parallel.

198.1, for single comminutors of this type.

**156** This subclass is indented under subclass 155. Apparatus in which all of the comminuting zones employ at least one surface which has compound movement.

- (1) Note. See the definition of subclass 201 of this class, for a definition of compound movement type comminutors.

SEE OR SEARCH THIS CLASS, SUBCLASS:

140, for compound movement type comminutors arranged for parallel or series-parallel flow of material.

201+, for single compound movement type comminutors.

**157** This subclass is indented under subclass 155. Apparatus in which all of the comminuting zones involve the use of cooperating surfaces at least one of which rotates.

SEE OR SEARCH THIS CLASS, SUBCLASS:

141+, for such comminutors arranged parallel or series-parallel.

220+, for single comminutors of this type.

**158** This subclass is indented under subclass 157. Apparatus in which all of the comminuting zones are the type in which the material flows circumferentially or tangentially of the rotary surfaces during comminution.

SEE OR SEARCH THIS CLASS, SUBCLASS:

142+, for such devices arranged parallel or series-parallel.

221+, for single comminutors of this type.

**159** This subclass is indented under subclass 158. Apparatus in which all of the cooperating surfaces have rotary motion.

SEE OR SEARCH THIS CLASS, SUBCLASS:

143+, for such devices arranged parallel or series-parallel.

227+, for single comminutors of this type.

**160** This subclass is indented under subclass 158. Apparatus provided with a plurality of rotary surfaces each of which cooperates with a non-rotary surface.

- (1) Note. See this class, subclass 240, for devices in which a plurality of independently adjustable nonrotary surfaces cooperate with a single rotary surface. For purposes of this classification, material which is subjected to the action of a single rotary surface cooperating with a plurality of nonrotary surfaces is considered to be treated in a single comminuting zone.

SEE OR SEARCH THIS CLASS, SUBCLASS:

142, for such devices arranged parallel or series-parallel.

- 221+, 237 to 243, for single comminutors of this type.
- 161** This subclass is indented under subclass 157. Apparatus in which the material flows axially and/or radially of a rotary comminuting surface during the comminuting operation in each of the comminuting zones.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 146, for such devices arranged in parallel or series-parallel.  
 244+, for single comminutors of this type.
- 162** This subclass is indented under subclass 161. Apparatus in which the rotating surfaces of the respective comminuting zones have a common axis of simple rotation.
- 163** This subclass is indented under subclass 162. Apparatus in which the common axis of rotation is horizontal.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 255+, for single comminutors of the type having horizontal axes.
- 164** This subclass is indented under subclass 155. Apparatus in which all of the comminuting zones employ cooperating surfaces which reciprocate relative to each other.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 147+, for reciprocating comminutors arranged for parallel or series-parallel flow of material.  
 262+, for single reciprocating type comminutors.
- 165** This subclass is indented under subclass 164. Apparatus in which the reciprocation of the moving surfaces is in a vertical straight line path.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 149, for plural devices of this type arranged for parallel or series-parallel flow of material.  
 270+, for single devices of this type.
- SEE OR SEARCH CLASS:  
 384, Bearings, subclasses 7+, for linear bearings for plurality of reciprocating stamp stems and no significant comminutor structure.
- 165.5 All comminuting zones of rotating noncooperating type:**  
 This subclass is indented under subclass 152.1. Apparatus in which all of the comminuting zones are of the type in which the comminution is effected by a single comminuting surface which has a simple rotary motion.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 277, for a comminuting device, per se, which has a single comminuting surface with a simple rotary motion.
- 166** This subclass is indented under the class definition. Apparatus in which there is provided means to scrape or otherwise clean a comminuting member.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 38+, for fluid applying combinations in which the fluid may have a cleaning function.  
 119, and 124, for cleaning and discharge devices combined with comminutors of the type there classified.  
 172, for material moving members in loose grinding body comminutors which do not have a cleaning function.
- SEE OR SEARCH CLASS:  
 15, Brushing, Scrubbing, and General Cleaning, subclass 256.5, and the notes thereto, for cleaners and scrapers for moving comminuting elements in which no claim is made to significant comminuting features.
- 167** This subclass is indented under subclass 166. Apparatus in which the cleaning or scraping member acts upon the material contacting surface of a rotary comminuting member.



- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
112, for other comminutors provided with scrapers for roll members.
- 168** This subclass is indented under the class definition. Apparatus adapted to be hand supported during the operation of the comminutor. Most of the devices found herein are table or kitchen devices used to comminute condiments and the like.
- SEE OR SEARCH CLASS:  
222, Dispensing, subclasses 196.1+, for dispensers of the hand manipulable shaker type which have a jarring or vibrating element to aid in the dispensing.
- 169** This subclass is indented under subclass 168. Apparatus in which the comminution is effected by cooperating surfaces which reciprocate relative to each other.
- (1) Note. Most of the devices in this subclass are ice crushers having means to handle only a single ice cube.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
84, and 262+, for comminuting devices having relatively reciprocating comminuting surfaces.
- SEE OR SEARCH CLASS:  
30, Cutlery, subclasses 164.5+, for ice picks and chippers.  
100, Presses, subclasses 234 and 243 for presses not elsewhere classified of the plier type.
- 169.1** This subclass is indented under subclass 168. Apparatus including a comminutor which moves in an arcuate path during comminution.
- SEE OR SEARCH CLASS:  
452, Butchering, subclass 105 for a rotary hand-held fish scalers.
- 169.2** This subclass is indented under subclass 168. Apparatus comprising a manually manipulated pressure or striking tool.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
199+, for devices of this type combined with a cooperating surface of a batch container.  
274+, for a stationary comminuting surface or material bed.
- 170** This subclass is indented under the class definition. Apparatus in which the comminution is effected by a loose comminuting body or bodies. These devices are mostly of the type commonly called ball or rod mills in which loose balls or rods are tumbled with the material within a moving receptacle.
- (1) Note. By the term “loose” as used above is meant the body or bodies are not restricted in their movement to any particular direction. Devices in which the body or bodies are mounted so as to be free to reciprocate, rotate or oscillate in restricted paths will be found in other appropriate subclasses of this class.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
54, for the defined devices provided with gas supply means.  
70+, for the defined devices provided with discharge permitting screens.  
83+, for such comminutors provided with perforated receptacle.  
103+, for comminutors employing balls or rolls supported on frictional drive surfaces (ball chasers), also see subclasses 173+, below.  
137, and 153, for plural loose grinding body comminutors. Partitioned receptacles were considered to be plural devices where the partition was sufficiently extensive to create distinct comminuting zones.  
284, for comminutors in which material (without the use of loose bodies) is tumbled within a moving receptacle to effect the comminution.
- SEE OR SEARCH CLASS:  
99, Foods and Beverages: Apparatus, subclass 600, for grain hullers employing loose abrading material.

- 451, Abrading, subclasses 326+ for a device adapted to tumble objects or articles in order to remove unwanted coatings, etc. Such a device often includes loose bodies to assist in the abrading operation.
- 171** This subclass is indented under subclass 170. Apparatus provided with mechanism for primarily presenting material to the comminuting zone and/or removing it therefrom or for controlling the flow of material to and/or from the comminuting zone.
- (1) Note. The term "mechanism" is intended to denote means in addition to gravity for positively effecting the feed and/or discharge but may include merely means attached to the moving receptacle of the comminutor.
- (2) Note. The feeding and/or discharging must be an operation other than the mere comminuting movement of the comminuting surfaces. However, means for moving the comminuting receptacle out of comminuting position for the specific purpose of discharging material was considered a discharging organization for this group.
- (3) Note. Material handling features in addition to those necessary to effect the mere presentation of the material to the comminuting zone or to remove the material from the comminutor were considered to be combined features which were more than mere feeding or discharging combinations and were classified in subclasses 101.01+ unless provided for elsewhere.
- (4) Note. The various feeding and/or discharging subclasses of this class for feeders and/or dischargers in combination with other types of comminutors. Where no feeding and/or discharging group was provided, the patents were classified with the particular comminutor combination claimed.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 153, for partitioned loose body grinders provided with means to transfer material from one section of the comminutor to the next.
- 301, for feeders and/or dischargers combined with comminutors where the latter was claimed so broadly as to fail to present a basis for classification in a specific comminutor group.
- SEE OR SEARCH CLASS:
- 198, Conveyors: Power-Driven, for feeders and dischargers involving the use of conveyors, per se, particularly subclass 658 for drum feeders comprising an internal screw conveyor within the trunnion of the drum.
- 221, Article Dispensing, appropriate subclasses for article dispensers, not otherwise classified, per se.
- 222, Dispensing, appropriate subclasses for fluent material dispensers, per se.
- 414, Material or Article Handling, for the generic subject matter of material handling, per se.
- 172** This subclass is indented under subclass 170. Apparatus provided with means mounted independently of the receptacle for the loose grinding bodies which moves or guides the material and/or the grinding bodies during the comminuting operation to aid in the comminution.
- 173** This subclass is indented under subclass 172. Apparatus in which the means for moving the grinding bodies comprises a rotary member which pushes the bodies about the receptacle in contact therewith to cause them to roll thereon.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 103+, for devices in which the comminuting bodies are mounted between relatively moving frictional drive supporting surfaces which are not mere pushers.
- 174** This subclass is indented under subclass 173. Apparatus in which the pusher member rotates about a horizontal axis.
- 175** This subclass is indented under subclass 170. Apparatus in which the receptacle for the loose grinding bodies has movement which is the combined result of several simple movements.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
201+, for other comminutors provided with members having compound movement.
- 176** This subclass is indented under subclass 170. Apparatus in which the loose grinding body or bodies are mounted in a receptacle which has a rotary motion.
- (1) Note. Search for mounting and drive means or other characteristics applicable to rotary receptacles in general should be continued in the many classes containing patents utilizing rotary receptacles. See the notes appended to the definition of subclass 108 in Class 34, Drying and Gas or Vapor Contact With Solids, for references to many of these classes. Particular attention is directed to Class 259, Agitating, subclasses 3, 14+, 50+, 57+, 81+, and 175+, for rotary receptacles which function as agitators.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
54, for such devices in which a gas current passes through the receptacle.  
70+, for such devices provided with over-size discharge preventing screens.  
91, for such apparatus in which the receptacle walls are provided with passages for the material.
- SEE OR SEARCH CLASS:  
248, Supports, subclasses 130 and 131, for supports for rotary receptacles.
- 177** This subclass is indented under subclass 176. Devices in which the receptacle is so mounted that the axis may be tilted for adjustment of the inclination of the axis about which the receptacle rotates during comminution.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
171, for receptacles tiltably mounted for discharge of the contents.
- 178** This subclass is indented under subclass 176. Apparatus in which the rotary receptacle is supported for rotation upon roller members.
- SEE OR SEARCH CLASS:  
384, Bearings, subclass 549 for a roller supports for rotating receptacle.
- 179** This subclass is indented under subclass 170. Apparatus in which the claims are directed to the structure of the receptacles for the grinding body or bodies.
- (1) Note. Patents claiming the combination of the receptacle with the grinding bodies, but in which no significant characteristics of the grinding bodies or of their relationship with the receptacle are claimed, will be found herein.
- (2) Note. Many classes include the treatment of material in moving receptacles. A partial list of such classes will be found in the notes to subclass 108 in Class 34, Drying and Gas or Vapor Contact With Solids. Metallic receptacles of general application will be found in Class 220, Receptacles.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
91, for receptacle structures in which the receptacle wall is perforated to allow discharge of comminuted material.
- 180** This subclass is indented under subclass 179. Apparatus in which the receptacle is provided with an opening at some point other than at the axis thereof. Usually the opening is provided with some form of removable cover.
- 181** This subclass is indented under subclass 179. Apparatus in which the receptacle is provided with means at the end or ends thereof to lift and/or distribute the material and grinding bodies.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
171, for devices in which the lifting or distributing means is for the purpose of feeding or discharging the material to or from the receptacle.  
183, for lined receptacles provided with lifting or distributing characteristics.

- 182** This subclass is indented under subclass 179. Apparatus provided with means lining the interior of the receptacle. Such means usually has wear resistant properties.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

285.1, and 291+, for frames and comminuting elements provided with wear-resistant linings or coverings.

SEE OR SEARCH CLASS:

220, Receptacles, subclasses 23.9, 62.21, 495.01+, 574.3, and 908.1+ for a receptacle having a liner.

229, Envelopes, Wrappers, and Paperboard Boxes, subclasses 117.27+ and 164.2 for a paperboard box having a lining.

- 183** This subclass is indented under subclass 182. Apparatus in which the lining means is provided with means for lifting or distributing the contained material.

- (1) Note. See the notes to subclass 179 for a list of classes providing for receptacles having lining means with lifting or distributing characteristics.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

181, for such devices in which the end structure of the receptacle is provided with lifting or distributing characteristics.

- 184** This subclass is indented under subclass 170. Apparatus in which the claims are directed to the structure of the grinding body or bodies. Patents claiming the receptacle in combination with the grinding bodies, but no significant structure of the receptacle, will be found herein.

- (1) Note. Where the grinding element is claimed with no significant structure, but merely in terms of the composition of which it is composed, it will be classified in the appropriate composition class, even though there is no claim to the composition, per se. In this connection the classes in the Search Notes below should be considered.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

291+, for other types of comminuting elements.

SEE OR SEARCH CLASS:

75, Specialized Metallurgical Processes, Compositions for Use Therein, Consolidated Metal Powder Compositions, and Loose Metal Particulate Mixtures, for articles defined solely by their metal or alloy composition.

106, Compositions: Coating or Plastic, Note particularly the main class definitions of Class 106 for the classification of other compositions.

148, Metal Treatment, especially subclasses 400+ for materials which are products of processes of treating metals classifiable in Class 148 or for products distinguished only by the internal structure or characteristics of the metals, metallic compositions or alloys comprising such structures.

451, Abrading, subclass 330 for loose bodies to be used in an abrading tumbling device.

#### **185.5 Rotary striking member with feed or discharge conveyor or regulator:**

This subclass is indented under the class definition. Apparatus in which the material is subjected to the action of a rotary member which strikes the material a sudden blow to effect comminution; combined with means to supply material to or remove material from the vicinity of the rotary comminuting member; or combined with means to control the flow of supply or removal of material from the comminuting zone.

- (1) Note. The term "mechanism" is intended to denote means in addition to gravity for positively effecting the feed or discharge.

- (2) Note. The feeding or discharging must be an operation other than the mere comminuting movement of the comminuting surfaces. However, means for moving a comminuting member out of comminuting position for the specific purpose of

discharging material was considered a discharging organization for this group.

- (3) Note. Material handling features in addition to those necessary to effect the mere presentation of the material to the comminuting zone or to remove the material from the comminutors were considered to be combined features which were more than mere feeding or discharging combinations and were classified in subclass 101 unless provided for elsewhere.
- (4) Note. A feeder or discharger in combination with a particular comminuting device is to be found with the comminuting device in this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 27, for the process of comminuting by use of a rotary striking member.
- 39, for apparatus in which fluid suspended material is projected against a rotary member which strikes it a blow or in which a rotary member has the additional function of projecting material in a fluid current to effect further comminution against a surface or other portions of the material.
- 55, for a comminuting device having a rotary striking member combined with gas moving means.
- 86+, for a comminuting device in which the rotary striking member cooperates with a surface having openings.
- 138, and 154, for the combination of a plurality of rotary striking member comminutors.
- 275, for a device in which a rotary member merely acts as a projector for material to centrifugally force it against another surface. A device having a rotary member which projects material centrifugally as described and in addition strikes the material a blow to effect a partial comminution before being projected is classified in subclasses 185.5-197.
- 301, for a feeder or discharger combined with a comminutor where the latter was claimed so broadly as to fail to present a basis for classification in

subclass directed to the specific comminutor.

SEE OR SEARCH CLASS:

- 19, Textiles: Fiber Preparation, subclasses 30, 33, 35+, and 85+ for a textile preparation machine having similar operation.
- 198, Conveyors: Power-Driven, for a feeder or discharger involving the use of a conveyor, per se.
- 221, Article Dispensing, for an article dispenser, not otherwise classified, per se.
- 222, Dispensing, for a fluent material dispenser, per se.
- 366, Agitating, subclasses 279+ for agitation only effected by rotatable member.
- 414, Material or Article Handling, for the generic subject matter of material handling, per se.
- 460, Crop Threshing or Separating, subclasses 59+ for a threshing machine using a rotary striking member.

**185.6 Rotary striking member combined with pump:**

This subclass is indented under subclass 185.5. Apparatus in which the material is subjected to the action of a rotary member which strikes the material a sudden blow to effect comminution; wherein the means to feed or discharge material is particularly adapted to transfer flowable material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 46.012, for a dishwasher combined with a comminutor which may be associated with a drain pump.

SEE OR SEARCH CLASS:

- 415, Rotary Kinetic Fluid Motors or Pumps, especially subclass 121.1 for a device of that class including an impeller which comminutes material passing through the device.

- 186.1** This subclass is indented under subclass 185.5. Apparatus provided with channels which guide the material as it flows toward the zone where it is engaged by the comminuting member.

- (1) Note. The channels may be grooves or apertures that are not necessarily parallel.
- (2) Note. Although some of these devices have openings which permit discharge of material, as in subclasses 83+, they are not true comminuting surfaces, being offset from the knife.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

134+, for a device provided with plural parallel material paths through plural parallel comminuting zones.

**186.2** This subclass is indented under subclass 185.5. Apparatus provided with means to effect a change in the flow of material to or from the comminutor.

**186.3** This subclass is indented under subclass 186.2. Apparatus provided with means to change the course of the material as it flows to or from the comminuting zone.

**186.35 Endless loop feed or discharge conveyor:**  
This subclass is indented under subclass 185.5. Apparatus wherein the means to supply material to or remove material comprises a flaccid belt supported at spaced areas such that portions of the belt travel in an orbit, one portion thereof following the other.

**186.4** This subclass is indented under subclass 185.5. Apparatus wherein the material mover revolves, or swings back and forth about an axis that passes through the mover.

**186.5 Screw feed or discharge conveyor:**  
This subclass is indented under subclass 186.4. Apparatus wherein the material mover revolves about an axis passing through its center and is helically ribbed so that the rib functions to engage the material and transport that material along its axis.

**187** This subclass is indented under the class definition. Apparatus in which the material is subjected to the action of a rotary member which strikes the material a sudden blow to effect the comminution in which the surface or member which cooperates with the rotary striking mem-

ber has movement during the comminuting operation. The cooperating member may be another rotary striking member.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

27, for the process of comminuting by use of a rotary striking member.

39, for apparatus in which fluid suspended material is projected against a rotary member which strikes it a blow or in which a rotary member has the additional function of projecting material in a fluid current to effect further comminution against a surface or other portions of the material.

55, for a comminuting device having a rotary striking member combined with gas moving means.

86+, for a comminuting device in which the rotary striking member cooperates with a surface having openings.

138, and 154, for comminutors having plural cooperating striking members but in which each rotor, without the other, functions as an independent comminutor.

200, 227+ and 237, for similar comminutors in which a rotor cooperates with a moving surface.

275, for a device in which a rotary member merely acts as a projector for material to centrifugally force it against another surface. A device having a rotary member which projects material centrifugally as described and in addition strikes the material a blow to effect a partial comminution before being projected is classified in subclasses 185.5-197.

301, for a feeder or discharger combined with a comminutor where the latter was claimed so broadly as to fail to present a basis for classification in subclass directed to the specific comminutor.

SEE OR SEARCH CLASS:

19, Textiles: Fiber Preparation, subclasses 30, 33, 35+, and 85+ for a textile preparation machine having similar operation.

- 198, Conveyors: Power-Driven, for a feeder or discharger involving the use of a conveyor, per se.
- 221, Article Dispensing, for an article dispenser, not otherwise classified, per se.
- 222, Dispensing, for a fluent material dispenser, per se.
- 366, Agitating, subclasses 279+ for agitation only effected by rotatable member.
- 414, Material or Article Handling, for the generic subject matter of material handling, per se.
- 460, Crop Threshing or Separating, subclasses 59+ for a threshing machine using a rotary striking member.

**188.1 Rotary striking member with axial or radial flow of material:**

This subclass is indented under the class definition. Apparatus in which the material is subjected to the action of a rotary member which strikes the material a sudden blow to effect comminution in which the material flows radially or axially of the rotary striking member during comminution.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 27, for the process of comminuting by use of a rotary striking member.
- 39, for apparatus in which fluid suspended material is projected against a rotary member which strikes it a blow or in which a rotary member has the additional function of projecting material in a fluid current to effect further comminution against a surface or other portions of the material.
- 55, for a comminuting device having a rotary striking member combined with gas moving means.
- 86+, for a comminuting device in which the rotary striking member cooperates with a surface having openings.
- 138, and 154, for the combination of a plurality of rotary striking member comminutors.
- 244, for other comminutors in which the material has a radial or axial flow.
- 275, for a device in which a rotary member merely acts as a projector for material to centrifugally force it against

another surface. A device having rotary a member which projects material centrifugally as described and in addition strikes the material a blow to effect a partial comminution before being projected is classified in subclasses 185.5-197.

- 301, for a feeder or discharger combined with a comminutor where the latter was claimed so broadly as to fail to present a basis for classification in subclass directed to the specific comminutor.

SEE OR SEARCH CLASS:

- 19, Textiles: Fiber Preparation, subclasses 30, 33, 35+, and 85+, for a textile preparation machine having similar operation.
- 198, Conveyors: Power-Driven, for a feeder or discharger involving the use of a conveyor, per se.
- 221, Article Dispensing, for an article dispenser, not otherwise classified, per se.
- 222, Dispensing, for a fluent material dispenser, per se.
- 366, Agitating, subclasses 279+ for agitation only effected by rotatable member.
- 414, Material or Article Handling, for the generic subject matter of material handling, per se.
- 460, Crop Threshing or Separating, subclasses 59+ for a threshing machine using a rotary striking member.

**188.2 Radial flow, pin-disc comminutor, overlapping pins on cooperating members:**

This subclass is indented under subclass 188.1. Apparatus including a rotor having a planar surface, which rotor is adapted to turn about an axis normal to and passing through the center of that planar surface, having a circular row of elongated striking members extending axially from that planar surface; the apparatus including fixed structure having a circular row of elongated members concentric to the row on the rotor; and either the rotor or the fixed member having an additional concentric, circular row of elongated members the concentric rows arranged to interfit with each other.

- (1) Note. Each pin (elongated member) is finger-like, but may be bridged to an adjacent pin. A flow directing member, e.g., a vane, is not considered to be a "pin" for this subclass. Also, a perforated cylinder is not considered to be a series of bridged pins.

### 189.1 Rotary striking member with circumferential or tangential flow:

This subclass is indented under the class definition. Apparatus in which the material is subjected to the action of a rotary member which strikes the material a sudden blow to effect comminution including provision to guide the material being comminuted (a) to move generally along the perimeter of the rotary striking member during comminution or (b) to move along a line intersecting the perimeter of the rotary striking member during comminution.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 27, for the process of comminuting by use of a rotary striking member.
- 39, for apparatus in which fluid suspended material is projected against a rotary member which strikes it a blow or in which a rotary member has the additional function of projecting material in a fluid current to effect further comminution against a surface or other portions of the material.
- 55, for a comminuting device having a rotary striking member combined with gas moving means.
- 86+, for a comminutor having a rotary moving comminuting surface and a cooperating comminuting surface provided with openings to permit discharge of material.
- 138, and 154, for the combination of a plurality of rotary striking member comminutors.
- 221+, and the notes thereto for other rotary comminutors in which the material has similar flow but having no striking member.
- 275, for a device in which a rotary member merely acts as a projector for material to centrifugally force it against another surface. A device having a rotary member which projects mate-

rial centrifugally as described and in addition strikes the material a blow to effect a partial comminution before being projected is classified in subclasses 185.5-197.

- 301, for a feeder or discharger combined with a comminutor where the latter was claimed so broadly as to fail to present a basis for classification in subclass directed to the specific comminutor.

SEE OR SEARCH CLASS:

- 19, Textiles: Fiber Preparation, subclasses 30, 33, 35+, and 85+ for a textile preparation machine having similar operation.
- 198, Conveyors: Power-Driven, for a feeder or discharger involving the use of a conveyor, per se.
- 221, Article Dispensing, for an article dispenser, not otherwise classified, per se.
- 222, Dispensing, for a fluent material dispenser, per se.
- 366, Agitating, subclasses 279+ for agitation only effected by rotatable member.
- 414, Material or Article Handling, for the generic subject matter of material handling, per se.
- 460, Crop Threshing or Separating, subclasses 59+ for a threshing machine using a rotary striking member.

### 189.2 Reversible rotary mill:

This subclass is indented under subclass 189.1. Apparatus wherein the rotary striking member is adapted to comminute in either direction of rotation.

- 190 This subclass is indented under subclass 189.1. Apparatus in which the members which cooperate to subject the material to a blow intermesh or overlap each other.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 243, for similar devices having intermeshing comminuting members, but in which the rotary member has no striking function.



**191** This subclass is indented under the class definition. Apparatus in which the material is subjected to the action of a rotary member which strikes the material a sudden blow to effect the comminution in which the claims are directed to the rotary support for the striking members or the striking members in combination with such support.

- (1) Note. Patents claiming the combination of parts of the machine and the rotary structure have been included only where there is no mention of significant characteristics of such other parts.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 27, for the process of comminuting by use of a rotary striking member.
- 39, for apparatus in which fluid suspended material is projected against a rotary member which strikes it a blow or in which a rotary member has the additional function of projecting material in a fluid current to effect further comminution against a surface or other portions of the material.
- 55, for a comminuting device having a rotary striking member combined with gas moving means.
- 86+, for a comminuting device in which the rotary striking member cooperates with a surface having openings.
- 138, and 154, for the combination of a plurality of rotary striking member comminutors.
- 195+, for hammer or striking members, per se.
- 275, for a device in which a rotary member merely acts as a projector for material to centrifugally force it against another surface. A device having rotary a member which projects material centrifugally as described and in addition strikes the material a blow to effect a partial comminution before being projected is classified in subclasses 185.5-197.
- 291+, for other comminuting elements, per se.
- 301, for a feeder or discharger combined with a comminutor where the latter was claimed so broadly as to fail to

present a basis for classification in subclass directed to the specific comminutor.

SEE OR SEARCH CLASS:

- 19, Textiles: Fiber Preparation, subclasses 30, 33, 35+, and 85+, for a textile preparation machine having similar operation.
- 198, Conveyors: Power-Driven, for a feeder or discharger involving the use of a conveyor, per se.
- 221, Article Dispensing, for an article dispenser, not otherwise classified, per se.
- 222, Dispensing, for a fluent material dispenser, per se.
- 366, Agitating, subclasses 279+ for agitation only effected by rotatable member.
- 414, Material or Article Handling, for the generic subject matter of material handling, per se.
- 460, Crop Threshing or Separating, subclasses 59+ for a threshing machine using a rotary striking member.

**192** This subclass is indented under subclass 191. Apparatus in which the striking members are so mounted relative to the rotary support that their radial projection may be adjusted.

- (1) Note. Alternatively usable means to support the striking members in various positions on the rotor was considered adjusting means for this subclass.

**193** This subclass is indented under subclass 191. Apparatus in which the striking member or members have a loose connection with the rotary support for free movement in at least one direction.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 196, for ring type striking members which are adapted to be loosely mounted on a rotor support member.

**194** This subclass is indented under subclass 191. Apparatus in which the rotor is provided with material striking members which are pivotally connected thereto.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

195+, for striking members, per se, which are adapted to be pivotally connected to a rotor.

**195** This subclass is indented under the class definition. Apparatus in which the material is subjected to the action of a rotary member which strikes the material a sudden blow to effect the comminution in which the claims are directed to the striking members, per se, which deliver the blow to the material being comminuted.

(1) Note. Patents claiming the combination of other parts of the machine with the striking members have been included only where there is no significant characteristics of such other parts.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

27, for the process of comminuting by use of a rotary striking member.

39, for apparatus in which fluid suspended material is projected against a rotary member which strikes it a blow or in which a rotary member has the additional function of projecting material in a fluid current to effect further comminution against a surface or other portions of the material.

55, for a comminuting device having a rotary striking member combined with gas moving means.

86+, for a comminuting device in which the rotary striking member cooperates with a surface having openings.

138, and 154, for the combination of a plurality of rotary striking member comminutors.

191+, for such striking members in combination with the rotary support therefor.

275, for a device in which a rotary member merely acts as a projector for material to centrifugally force it against another surface. A device having rotary a member which projects material centrifugally as described and in addition strikes the material a blow to effect a partial comminution before

being projected is classified in subclasses 185.5-197.

301, for a feeder or discharger combined with a comminutor where the latter was claimed so broadly as to fail to present a basis for classification in subclass directed to the specific comminutor.

SEE OR SEARCH CLASS:

19, Textiles: Fiber Preparation, subclasses 30, 33, 35+, and 85+, for a textile preparation machine having similar operation.

198, Conveyors: Power-Driven, for a feeder or discharger involving the use of a conveyor, per se.

221, Article Dispensing, for an article dispenser, not otherwise classified, per se.

222, Dispensing, for a fluent material dispenser, per se.

366, Agitating, subclasses 279+ for agitation only effected by rotatable member.

414, Material or Article Handling, for the generic subject matter of material handling, per se.

460, Crop Threshing or Separating, subclasses 59+ for a threshing machine using a rotary striking member.

**196** This subclass is indented under subclass 195. Apparatus in which the striking member is in the form of an annulus adapted to be loosely mounted on its support.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

193, for this type of striking member combination with the rotary support therefor.

**197** This subclass is indented under subclass 195. Apparatus in which the striking member is provided with a rigidly attached wear member at the striking surface thereof.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

294+, 298 and 300, for other types of comminuting elements provided with means to attach a wear face thereto.

**198.1 Cooperating comminuting surfaces (e.g., jaw crusher):**

This subclass is indented under the class definition. Apparatus in which the comminution of the material takes place between two relatively moving surfaces which cooperate to effect the comminuting operation.

- (1) Note. A number of classes provide for the treatment of material between relatively moving cooperating surfaces to change the dimensions, particle size, or other properties of the material. A partial list of such classes as were considered to present analogous subject matter will be found below under "Search Class".

SEE OR SEARCH THIS CLASS, SUBCLASS:

274+, 277+ and 283, and the notes thereto, for a device in which the comminution is effected by the cooperation of the material directly with a single surface.

SEE OR SEARCH CLASS:

17, Butchering, subclasses 25+.  
 29, Metal Working, subclasses 4.51+.  
 68, Textiles: Fluid Treating Apparatus, subclasses 97 and 244+.  
 72, Metal Deforming, appropriate subclasses.  
 81, Tools, subclasses 9.4+.  
 83, Cutting, appropriate subclasses.  
 99, Foods and Beverages: Apparatus, for food separating means that has relative movement.  
 100, Presses, appropriate subclasses.  
 126, Stoves and Furnaces, subclasses 152+.  
 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclass 363 for a press couple including an endless surface and subclasses 406+ for other press couples.  
 451, Abrading, subclasses 110, 112, 132+, 194+, 262, and 302 for an abrading machine using opposed abrading tools.  
 460, Crop Threshing or Separating, appropriate subclasses.

**199** This subclass is indented under subclass 198.1. Apparatus in which the material is treated in batches rather than as a stream passing through the comminuting zone.

- (1) Note. Included in this subclass will be found a number of patents directed to devices for forming dental amalgam. In some of these devices the function appears to be purely one of mixing, but in view of their similarity to mortars and pestles used for comminution these patents have been classified here even though there is no mention of a comminuting function.

**199.1** This subclass is indented under subclass 199. Apparatus wherein the batch of material is retained in a zone of comminution by a material holder, and means to move the holder or structure supporting the holder.

SEE OR SEARCH THIS CLASS, SUBCLASS:

270+, for a similar device in which there is a flow of material through the comminuting zone.

**199.11** This subclass is indented under subclass 199.9. Apparatus including means to move a tool or tool holder in a straight line.

SEE OR SEARCH THIS CLASS, SUBCLASS:

199.8, for reciprocating tools with a moving support.  
 262, for reciprocating surface or surfaces.

**199.12** This subclass is indented under subclass 199.9. Apparatus including a tool or tool holder mounted for movement about a fixed axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:

199.7, for rotary tools with a moving support.  
 220+, for rotary surface or surfaces.

**199.2** This subclass is indented under subclass 199.1. Apparatus wherein a comminuting tool moves relative to the material holder and the material holder moves in a stop-and-go fashion; and wherein the means to cause tool motion and the

- holder motion are connected together or synchronized with each other.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
272, for a similar device in which there is a flow of material through the comminuting zone.
- 199.3** This subclass is indented under subclass 199.2. Apparatus wherein the comminuting tool moves to-and-fro in a straight line.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
84.4, for a reciprocating comminuting tool urging a mass of material toward a comminuting surface having material discharge passageways.  
270+, for a vertically reciprocating comminuting tool in a device having a flow of material through the comminuting zone.
- 199.4** This subclass is indented under subclass 199.2. Apparatus wherein the work-contacting edge of the comminuting tool has an oscillating motion about an axis perpendicular to the length of the said tool edge.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
264+, for an oscillating tool in a device in which there is a flow of material through the comminuting zone.
- 199.5** This subclass is indented under subclass 199.1. Apparatus wherein the change of position of the material holder is one-way only.
- (1) Note. The motion may be intermittent, as in a rotatable support.
- 199.6** This subclass is indented under subclass 199.5. Apparatus including means to introduce a batch of material to, and/or to deliver it from, the material holder or means to facilitate removal of material.
- (1) Note. The material holder may be removed by hand for dumping the material from it.
- 199.7** This subclass is indented under subclass 199.5. Apparatus wherein a tool is mounted for movement in one direction only about a fixed axis.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
199.12, for rotary tools where the container is stationary during comminuting.  
220+, for rotary surface or surfaces.
- 199.8** This subclass is indented under subclass 199.5. Apparatus wherein a tool or tool holder is moved in alternate directions in a straight line.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
199.11, for reciprocating tools where the container is stationary during comminuting.  
262, for reciprocating surface or surfaces.
- 199.9** This subclass is indented under subclass 199. Apparatus wherein a material holder is immobile.
- 200** This subclass is indented under subclass 198.1. Devices in which one or both of the comminuting surfaces is in the form of an endless member.
- (1) Note. The motion of the belt may be intermittent or continuous.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
83+, for such devices in which the endless comminuting surface is provided with openings for the passage of material.  
187, for devices in which the endless member cooperates with a rotary striking member.
- SEE OR SEARCH CLASS:  
100, Presses, subclasses 151+ and see the Notes thereto for presses not elsewhere classified, having a pressing member in the form of an endless belt.  
198, Conveyors: Power-Driven, subclasses 804+, and the notes thereto for endless belt conveyors.  
222, Dispensing, subclasses 371 and 415 for endless type dispensers.

- 451, Abrading, subclass 302 for an abrader comprising opposed endless bands.
- 201** This subclass is indented under subclass 198.1. Apparatus in which the moving comminuting surface or surfaces has a motion which is the combined result of a plurality of a simple motions.
- (1) Note. It is to be noted that the defined compound movement relates to the surface of the comminuting member, not the member as a whole. See the note to subclass 203.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 103+, and 107+, for plural surfaces having compound movement relative to a common surface.  
 140, and 156, for plural comminutors of this type.
- SEE OR SEARCH CLASS:  
 74, Machine Element or Mechanism, appropriate subclasses, for operating mechanisms, per se, for compound movement comminuting elements.
- 202** This subclass is indented under subclass 201. Apparatus provided with mechanism for primarily presenting material to the comminuting zone and/or removing it therefrom or for controlling the flow of material to and/or from the comminuting zone.
- (1) Note. The term "mechanism" is intended to denote means in addition to gravity for positively effecting the feed and/or discharge.
- (2) Note. The feeding and/or discharging must be and operation other than the mere comminuting movement of the comminuting surfaces. However, means for moving a comminuting member out of comminuting position for the specific purpose of discharging material was considered a discharging organization for this group.
- (3) Note. Material handling features in addition to those necessary to effect the mere presentation of the material to the comminuting zone or to remove the material from the comminutor were considered to be combined features which were more than mere feeding or discharging combinations and were classified in subclasses 101.01+ unless provided for elsewhere.
- (4) Note. The various feeding and/or discharging subclasses of this class for feeders and/or dischargers in combination with other types of comminutors. Where no feeding and/or discharging group was provided, the patents were classified with the particular comminutor combination claimed.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 301, for feeders and/or dischargers combined with comminutors where the latter was claimed so broadly as to fail to present a basis for classification in a specific comminutor group.
- SEE OR SEARCH CLASS:  
 198, Conveyors: Power-Driven, for feeders and dischargers involving the use of conveyors, per se.  
 222, Dispensing, appropriate subclasses for fluent material dispensers, per se.  
 414, Material or Article Handling, for the generic subject matter of material handling, per se.
- 203** This subclass is indented under subclass 201. Apparatus in which the moving comminuting surface or surfaces has a motion which is the combined result of a plurality of simpler motions one of which is rotation.
- (1) Note. Mere nonsymmetrical arrangement of the rotary surface about a shaft (e.g., eccentrically mounted) was considered to give the surface compound movement. Accordingly, all devices having such eccentrically mounted surfaces were classified in this group.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 103+, and 107+, for plural surfaces having compound movement relative to a common surface.

- 220+, and the notes thereto for devices in which the comminuting surface has a simple rotary motion with no additional movement during comminution.
- SEE OR SEARCH CLASS:  
74, Machine Element or Mechanism, subclasses 20 through 24, for machine elements, per se, involving the defined type of motion.
- 204** This subclass is indented under subclass 203. Apparatus in which the material flows circumferentially and/or tangentially of the moving surface during comminution.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
221+, and the notes thereto for devices having these characteristics in which the motion of the moving surface or surfaces is simple rotation.
- 205** This subclass is indented under subclass 203. Apparatus in which the compound movement surface has a reciprocatory motion as well as a simple rotary motion relative to a cooperating surface to comminute material therebetween.
- (1) Note. The described motion of the surface must occur on the working or material comminuting stroke of the surface.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
204, for circumferential or tangential flow devices in which rotary surfaces also reciprocate.  
272, for devices in which a reciprocating comminuting surface is given a rotary motion on the noncomminuting stroke.
- SEE OR SEARCH CLASS:  
68, Textiles: Fluid Treating Apparatus, subclasses 102+, for devices having similar roll movements applied to textile treatment.  
74, Machine Element or Mechanism, subclass 22, for operating mechanisms for imparting the above movement to comminuting elements.
- 451, Abrading, subclasses 119+ for an abrading device in which an abrading tool has the defined motion.
- 206** This subclass is indented under subclass 203. Apparatus in which the surface which cooperates with the compound movement surface has movement during the comminuting operation.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
117+, for comminutors in which a plurality of surfaces having compound movement cooperate with a common surface which has movement.  
204, for devices in which both surfaces move and the material flows circumferentially or tangentially of a rotary surface.  
205, for devices in which the compound movement surface rotates and reciprocates and cooperates with a moving surface.
- 207** This subclass is indented under subclass 203. Apparatus in which the single compound movement surface has a simple gyratory or planetary motion.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
123+, for comminutors in which a plurality of surfaces having planetary movement cooperate with a common surface.  
203, for devices in which the comminuting element has a movement in addition to a simple gyratory or planetary motion.
- SEE OR SEARCH CLASS:  
68, Textiles: Fluid Treating Apparatus, subclasses 98 and 108+, for planetary and gyratory rolls for treating textiles.  
74, Machine Element or Mechanism, subclasses 86+, for mechanical movements for transforming rotary motion into gyratory motion.
- 208** This subclass is indented under subclass 207. Apparatus in which the gyratory movement is effected by an eccentric drive sleeve which is surrounded by the comminuting surface of the gyratory comminuting member.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 212, for devices provided with an eccentric drive sleeve above the gyratory member.  
 215, for devices in which the eccentric sleeve is below the gyratory member.
- 209** This subclass is indented under subclass 207. Apparatus in which the gyratory member is provided with a support or guide means above the comminuting zone.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 258, for rotary members suspended from a support above the comminuting zone.
- SEE OR SEARCH CLASS:  
 384, Bearings, subclasses 428+ for bearing for gyrating shafts.
- 210** This subclass is indented under subclass 209. Apparatus in which the gyratory movement of the moving member is effected by means of an unbalanced weight.
- SEE OR SEARCH CLASS:  
 74, Machine Element or Mechanism, subclass 87, for unbalanced weight means for transforming rotary motion into gyratory motion.
- 211** This subclass is indented under subclass 209. Apparatus in which the gyratory member is yieldingly mounted so as to be forcible away from the cooperating surface under abnormal conditions.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 121+, 127+, 230+, 239, and 286+, for other comminuting devices embodying a yielding mounting for the comminuting member.  
 210, for unbalanced weight driven gyratory comminuting members which are yieldably mounted.
- 212** This subclass is indented under subclass 209. Apparatus in which the upper guide or support for the gyratory shaft embodies means to effect the gyration of the comminuting member.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 208, for devices in which the gyratory drive is within the comminuting member.  
 215, for devices in which the gyratory drive member is below the comminuting zone.
- 213** This subclass is indented under subclass 209. Apparatus in which the shaft for the gyratory member is provided at its lower end with adjusting means to vary the gap between the cooperating surfaces.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 256, 258, and 259, for rotary members provided with adjusting means therefor.
- 214** This subclass is indented under subclass 207. Apparatus in which the comminuting member is mounted upon an eccentric shaft to effect the gyratory movement.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 208, and 215, for devices in which the gyratory movement is effected by an eccentric sleeve surrounding the shaft of the gyratory member.  
 212, for gyratory comminuting members actuated by an eccentric shaft above the comminuting zone.
- 215** This subclass is indented under subclass 207. Apparatus in which the gyratory movement of the comminuting member is effected by a driven eccentric sleeve on the comminuting member shaft below the comminuting zone.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 208, for such gyratory drive sleeves mounted within the gyratory member.  
 212, for eccentric sleeve drives for gyratory comminuting members mounted above the comminuting zone.
- 216** This subclass is indented under subclass 207. Apparatus provided with means to seal the comminuting zone from the drive means or other moving parts of the device.

**217** This subclass is indented under subclass 201. Devices in which the compound movement of the comminuting member is derived from an eccentric strap which is unitary with the comminuting member.

**218** This subclass is indented under subclass 217. Devices in which the compound movement surface cooperates with a surface which moves during the comminuting operation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

237, and the notes thereto for other devices having plural moving cooperating surfaces.

**219** This subclass is indented under subclass 201. Devices in which the compound movement surface is supported from a stationary part of the device by a link which is pivotally connected both to the comminuting member and to the stationary part.

**220** This subclass is indented under subclass 198. Apparatus in which at least one of the cooperating surfaces rotates about an axis which is contained within the confines of the surface.

(1) Note. For the purpose of classification in this group, the rotation must be continuous. Devices in which the rotation was intermittent were classified in subclass 198.1 or other appropriate subclass.

(2) Note. The notes to subclasses 198.1, 221 and 244, should be referred to for notes to other classes having similar organizations involving rotary surfaces.

SEE OR SEARCH THIS CLASS, SUBCLASS:

86, 138+, 154, and 185.5-197, for devices in which the comminution is effected by rotary striking members.

103+, 123+ and 203, for compound movement comminuting surfaces having rotary motion as a component thereof.

107+, for plural rotary surfaces which cooperate with a common surface.

141, and 157+, for plural comminutors having rotary cooperating comminuting surfaces.

277+, for comminutors having rotary surfaces which do not cooperate with a cooperating surface.

**221** This subclass is indented under subclass 220. Apparatus in which the material flows circumferentially or tangentially of the rotary surface during the comminuting operation.

(1) Note. Many patents were found in which the flow of the material through the comminuting zone was both that as defined above and also that of subclasses 244+. The factor which was considered to determine the proper classification of these patents was the general path of the material through the machine as defined by the relative position of the inlet and outlet for the material, i.e., even though there was incidental movement of the material in a circumferential direction during comminution, the patent was classified under subclasses 244+, if the inlet and outlet of the devices were axially spaced.

(2) Note. A number of classes (see "Search Class" below) provide for the treatment of material between cooperating members in which the material has the defined movement. See the notes to subclass 227 for references to such classes which provide for plural rotating surfaces.

SEE OR SEARCH THIS CLASS, SUBCLASS:

142+, and 158+, for plural devices of the defined type.

189.1+, for devices providing for similar flow of material relative to rotary striking members.

204, for devices providing for similar flow of material relative to compound movement surfaces.

SEE OR SEARCH CLASS:

100, Presses, subclasses 155+, and see the Notes thereto for roll type presses, not elsewhere classified.

452, Butchering, subclasses 143 and 145.

460, Crop Threshing or Separating, subclasses 46 and 59+.



**222** This subclass is indented under subclass 221. Apparatus provided with mechanism for primarily presenting material to the comminuting zone and/or removing it therefrom or for controlling the flow of material to and/or from the comminuting zone.

(1) Note. The term “mechanism” is intended to denote means in addition to gravity for positively effecting the feed and/or discharge.

(2) Note. The feeding and/or discharging must be an operation other than the mere comminuting movement of the comminuting surfaces. However, means for moving a comminuting member out of comminuting position for the specific purpose of discharging material was considered a discharging organization for this group.

(3) Note. Material handling features in addition to those necessary to effect the mere presentation of the material to the comminuting zone or to remove the material from the comminutors were considered to be combined features which were more than mere feeding or discharging combinations and were classified in subclasses 101.01+ unless provided for elsewhere.

(4) Note. The various feeding and/or discharging subclasses of this class for feeders and/or dischargers in combination with other types of comminutors. Where no feeding and/or discharging group was provided the patents were classified with particular comminutor combination claimed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

301, for feeders and/or dischargers combined with comminutors where the latter was claimed so broadly as to fail to present a basis for classification in a specific comminutor group.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, for feeders and dischargers involving the use of conveyors, per se.

222, Dispensing, appropriate subclasses for fluent material dispensers, per se.

414, Material or Article Handling, for the generic subject matter of material handling, per se.

**223** This subclass is indented under subclass 222. Apparatus in which the mechanism for feeding and/or discharging comprises an endless belt conveyor.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclasses 804+, for endless belt conveyors, per se.

222, Dispensing, subclasses 371 and 415, for endless belt type dispensers.

**224** This subclass is indented under subclass 222. Apparatus in which the feed mechanism operates in conjunction with a hopper to feed the material to the comminuting zone.

SEE OR SEARCH THIS CLASS, SUBCLASS:

248+, for hopper feeders operating in conjunction with other types of comminutors.

**225** This subclass is indented under subclass 224. Apparatus in which the feed mechanism comprises a roll or some form of rotary material agitator which operates in connection with a hopper to effect the feeding.

SEE OR SEARCH CLASS:

222, Dispensing, subclasses 410+, and the notes thereto for dispensers, per se, having rotary nongravity discharge assistants.

**226** This subclass is indented under subclass 221. Apparatus provided with means mounted at the axial end or ends of the rotary surface or surfaces which functions to prevent material from escaping at said ends.

**227** This subclass is indented under subclass 221. Apparatus in which both of the cooperating surfaces rotate.

- (1) Note. The devices classified in this group are those generally termed "roll mills". Devices in a number of classes treat material between rotating roll members for various purposes. A partial list of analogous devices will be found under "Search Class" below.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 113, for devices in which plural rotary surfaces cooperate with each other as well as a common surface.  
143+, and 159, for plural devices of this type.  
187, for such devices in which the cooperating surfaces are rotary striking members.

SEE OR SEARCH CLASS:

- 68, Textiles: Fluid Treating Apparatus, subclasses 99 and 244+.  
72, Metal Deforming, appropriate subclasses.  
99, Foods and Beverages: Apparatus, subclasses 520, 574, 584, 620, 624, and 627 for cooperating, rotating or moving surfaces used to separate a food item.  
100, Presses, subclasses 155+ and see the notes thereto for roll type presses not elsewhere classified.  
222, Dispensing, subclass 281.  
425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 363+.  
451, Abrading, subclasses 194+ for a machine using opposed rotary cylinder abrading tools.  
452, Butchering, subclass 142.  
460, Crop Threshing or Separating, appropriate subclasses.

**228** This subclass is indented under subclass 227. Apparatus in which one of the cooperating rotary members presents an internal annular comminuting surface to the other rotary surface for cooperation therewith.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 117+, for similar devices in which a plurality of rotary members cooperates with an internal comminuting surface especially subclass 122 for devices having an internal rotary comminuting surface.  
170+, for rotary members cooperating with internal comminuting surfaces in which the rotary member is loosely mounted.  
252, for devices of similar structure, but in which the flow of material is in a generally axial direction, rather than circumferential.

**229** This subclass is indented under subclass 227. Apparatus in which (1) the cooperating surfaces rotate in the same direction and/or (2) the one or both of the surfaces rotate on vertical or inclined axes and/or (3) one or both of the surfaces is eccentrically mounted on its axis.

**230** This subclass is indented under subclass 227. Apparatus provided with means for adjustably or yieldably mounting one or both of the rotary surfaces.

- (1) Note. See the reference to "Search Class" under subclasses 221 and 227, for other classes providing for adjustably or yieldably mounted roll members.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 32, for overload release devices as applied to rotary surface mounting means.  
37, for devices providing for automatic control of comminuting surface continuity.  
63+, for means to control the surface positioning means simultaneously with other functions of the device.  
122, for devices in which plural rotary surfaces are tensioned against a rotary internal surface.

**231** This subclass is indented under subclass 230. Apparatus in which (1) the adjusting or yielding means comprises hydraulic or pneumatic pressure devices and/or (2) one or both of the

rotary surfaces is adjustable or yieldable in the direction of its axis of rotation.

- (1) Note. Most of the devices under (2) above have surfaces which are of other than cylindrical shape. When the surface so departs from a cylinder that the material cannot be said to pass circumferentially or tangentially thereof, the device is properly classified in subclass 220.

SEE OR SEARCH CLASS:

384, Bearings, subclasses 202+ for flexible, or pneumatic bearing supports.

- 232** This subclass is indented under subclass 230. Apparatus in which at least one of the rotary surfaces is provided with a pivotally mounted support.

SEE OR SEARCH THIS CLASS, SUBCLASS:

121+, and 128+, for pivotally supporting a plurality of rolls relative to a common surface.

- 233** This subclass is indented under subclass 232. Apparatus in which the pivoted roll support is provided with an adjustable pivot point.

- 234** This subclass is indented under subclass 230. Apparatus in which means is provided for adjustably and/or yieldably mounting both rotating surfaces.

- 235** This subclass is indented under subclass 227. Apparatus in which one or both of the cooperating surfaces are not smooth but are provided with cooperating grooves, channels, protuberances or the like.

SEE OR SEARCH THIS CLASS, SUBCLASS:

96, for rolls provided with cooperating surface characteristics which reject certain types of material to prevent it from passing to the grinding nip.  
242+, and 260+, for surfaces provided with cooperating nonsmooth characteristics in other types of comminutors.  
293+, for single cylindrical comminuting elements provided with nonsmooth surfaces.

- 236** This subclass is indented under subclass 235. Apparatus in which the nonsmooth surface characteristics of the respective surfaces cooperate by intermeshing with or overlapping each other.

SEE OR SEARCH THIS CLASS, SUBCLASS:

190, 243 and 261, for intermeshing comminuting surface characteristics in other types of comminutors.

SEE OR SEARCH CLASS:

175, Boring or Penetrating the Earth, subclass 341 for a roller cutter type earth boring bit provided with plural rolling cutters having intermeshing teeth.

- 237** This subclass is indented under subclass 221. Apparatus in which the nonrotary surface which cooperates with the rotary surface is provided with means to move it during comminution.

SEE OR SEARCH THIS CLASS, SUBCLASS:

187, for such devices in which the rotary member is a rotary striking member.  
200, for such devices in which the nonrotary surface is a moving endless belt.  
201+, for such devices in which the nonrotary surface has a compound motion.  
206, for such devices in which the rotary surface has a compound motion.

SEE OR SEARCH CLASS:

68, Textiles: Fluid Treating Apparatus, subclass 105, for devices having similarly moving parts applied to textile treatment.  
100, Presses, subclass 47 for presses not elsewhere provided for, having automatic or triggered control of roll separation or speed.

- 238** This subclass is indented under subclass 221. Apparatus in which (1) there is provided a plurality of nonrotary surface parts so arranged as to cooperate with the rotary surface alternatively, or (2) the rotary member is provided with parts or projections adapted to be moved relatively to other parts of the rotor or (3) the rotary member is adjustably or yieldably

mounted in the frame of the apparatus or in which the apparatus is provided with a combination of all or any two of features (1), (2), or (3).

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 102, for deformable comminuting surfaces, parts of which move relatively to other parts due to contact with the material.
- 230+, and the notes thereto for devices in which a rotary surface is adjustably or yieldably mounted relative to another rotary surface.

SEE OR SEARCH CLASS:

- 222, Dispensing, subclasses 291 and 343, for feed rotors having retractable projections.

- 239** This subclass is indented under subclass 221. Apparatus in which a nonrotary surface which cooperates with the rotary surface is mounted so as to be adjustable or yieldable relative to the rotary surface.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 32, for means mounting a nonrotary surface for release upon overload.
- 37, for devices providing for automatic control of comminuting surface contiguity.
- 89, and 189, for similar arrangements wherein the rotary surface is a rotary striking member.
- 286+, for such devices in which the claimed invention is limited to the mounting of the nonrotary surface relative to the frame of the machine (i.e., the rotary member is not included significantly in combination).

- 240** This subclass is indented under subclass 239. Apparatus in which the nonrotary surface which cooperates with the rotary surface is made up of a plurality of independently adjustable sections.

- (1) Note. For purposes of this classification, circumferential or tangential flow devices in which material is subjected to the action of a single rotary surface

cooperating with a plurality of nonrotary surfaces are considered to present a single comminuting zone. Such devices are therefore classified in this or other appropriate subclasses in this group rather than as a plural comminutor combination.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 160, for the combination of a plurality of rotary surfaces each cooperating with a nonrotary surface.

- 241** This subclass is indented under subclass 239. Apparatus in which the nonrotary surface is so mounted as to be adjustable or yieldable radially of the rotary surface.

**241.5 Single roll jaw crusher:**

This subclass is indented under subclass 241. Apparatus in which the rotary surface is comprised of rotary member having a radially outwardly facing cylindrical working surface.

- 242** This subclass is indented under subclass 221. Apparatus in which one or both of the cooperating surfaces are not smooth but are provided with cooperating grooves, channels, protuberances or the like.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 235+, and 260+, for surfaces provided with cooperating nonsmooth characteristics in other types of comminutors.
- 291+, for single comminuting elements provided with nonsmooth surfaces.

- 243** This subclass is indented under subclass 242. Apparatus in which the nonsmooth surface characteristics of the respective surfaces cooperate by intermeshing with or overlapping each other.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 190, for rotary impact comminuting devices having intermeshing characteristics.
- 236, and 261, for intermeshing comminuting surface characteristics in other types of comminutors.

**244** This subclass is indented under subclass 220. Apparatus in which the material flows in a generally axial and/or radial direction relative to a rotary surface during the comminuting operation.

- (1) Note. See the note to subclass 221 for the line between this group and that providing for devices in which the material flows circumferentially or tangentially of the rotary surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 91+, 114, 188.1, 206, and 207+, for other comminutors in which the material flows axially and/or radially of a rotary member.  
146+, and 161+, for plural devices of this type.

SEE OR SEARCH CLASS:

- 100, Presses, subclasses 155+ and see the Notes thereto for roll type presses, not elsewhere classified.  
451, Abrading, subclasses 112 and 262+ for cooperating disk abraders.

**245** This subclass is indented under subclass 244. Apparatus provided with mechanism for primarily presenting material to the comminuting zone and/or removing it therefrom or for controlling the flow of material to and/or from the comminuting zone.

- (1) Note. The term “mechanism” is intended to denote means in addition to gravity for positively effecting the feed and/or discharge.
- (2) Note. The feeding and/or discharging must be an operation other than the mere comminuting movement of the comminuting surfaces. However, means for moving a comminuting member out of comminuting position for the specific purpose of discharging material was considered a discharging organization for this group.
- (3) Note. Material handling features in addition to those necessary to effect the mere presentation of the material to the com-

minuting zone or to remove the material from the comminutor were considered to be combined features which were more than mere feeding or discharging combinations and were classified in subclasses 101.01+ unless provided for elsewhere.

- (4) Note. The various feeding and/or discharging subclasses of this class for feeders and/or dischargers in combination with other types of comminutors. Where no feeding and/or discharging group was provided, the patents were classified with the particular comminutor combination claimed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 301, for feeders and/or dischargers combined with comminutors where the latter was claimed so broadly as to fail to present a basis for classification in a specific comminutor group.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, for feeders and dischargers involving the use of conveyors, per se.  
222, Dispensing, appropriate subclasses for fluent material dispensers, per se.  
414, Material or Article Handling, for the generic subject matter of material handling, per se.

**246** This subclass is indented under subclass 245. Devices in which the feeding mechanism comprises a rotary propeller or screw conveyor mounted axially of the rotary comminuting member.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 82.1+, for a rotary propeller, comminuting member and a perforated plate for passage of material feed by the propeller.  
162+, for comminutors in which the axially mounted rotary screw feeder is provided with means to subject the material to a preliminary comminution.

- SEE OR SEARCH CLASS:  
 198, Conveyors: Power Driven, sub-classes 425, 550.6, 550.10, 550.01, 513, 545, 548, 582, 608, 611+, 625, and 657+ for a screw conveyor.  
 222, Dispensing, subclasses 412+, for dispensers, per se, having screw propeller feeders.
- 247** This subclass is indented under subclass 246. Devices in which the axis of rotation of the propeller or screw is horizontal.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 251, and 255+, for horizontal axis comminutors of the type here provided for in which no feed propeller or screw is claimed.
- 248** This subclass is indented under subclass 245. Devices in which the control or feed mechanism operates in conjunction with a hopper.
- SEE OR SEARCH CLASS:  
 198, Conveyors: Power Driven, sub-classes 311, 359+ and 523+ for a conveyor feeding a load to, or receiving a load from, a hopper, and subclasses 550.01 and 582 for a bin having a conveyor for discharging a material therefrom.  
 222, Dispensing, appropriate subclasses, for hopper dischargers, per se.
- 249** This subclass is indented under subclass 248. Devices in which the feed mechanism comprises a receptacle beneath the hopper outlet which has a shaking movement to effect the feeding operation.
- SEE OR SEARCH CLASS:  
 222, Dispensing, subclass 199 and the notes thereto for similar feeders, per se.
- 250** This subclass is indented under subclass 244. Devices in which the rotary surface cooperates with a comminuting surface which moves during the comminuting operation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 206, for compound movement elements which cooperate with a moving surface.  
 237, for circumferential or tangential comminutors, having means to move the nonrotary surface.
- 251** This subclass is indented under subclass 250. Devices in which both cooperating surfaces have a rotary motion.
- (1) Note. The rotary motion of one of the surfaces may be due solely to frictional contact with the material or cooperating surface.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 117+, for devices in which a plurality of rotary surfaces cooperate with a common rotary surface.  
 227, for comminutors in which the material flows circumferentially or tangentially between a plurality of rotary surfaces.
- 252** This subclass is indented under subclass 251. Apparatus in which the surfaces rotate about axes which are respectively noncoaxial or eccentric relative to each other.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 206, for devices in which a surface having compound movement cooperates with a moving surface.  
 220, for devices in which the off-center or eccentric mounting is such that the path of the material is not in a generally radial and/or tangential direction.  
 254, for devices in which a single moving surface is mounted noncoaxially or eccentrically relative to a stationary surface.
- SEE OR SEARCH CLASS:  
 100, Presses, subclasses 155+ and see the Notes thereto for roll type presses, not elsewhere classified.

- 253** This subclass is indented under subclass 251. Devices in which the rotary motion of both surfaces is about a vertical axis.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 257.1, for devices in which a single surface rotates relative to another about a vertical axis.
- 254** This subclass is indented under subclass 244. Apparatus in which one comminuting surface rotates about an axis which is noncoaxial or eccentric to the axis or center line of the cooperating nonrotary surface.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 203+, for devices where the rotating surface has a compound movement relative to the axis of the stationary member.  
 220, for devices in which the off-center or eccentric mounting is such that the path of the material is not in a generally axial and/or radial direction.  
 252, for devices in which both cooperating surfaces rotate about noncoaxial axes.
- 257.1 Vertical axis:**  
 This subclass is indented under subclass 244. Apparatus in which the moving surface rotates about a vertical axis.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 46.017, for a garbage disposal having a liquid submerged comminutor having a vertical axis of rotation.  
 253, for a comminutor having two moving surfaces which both rotate about a vertical axis.
- 258** This subclass is indented under subclass 257.1. Devices in which the rotary shaft which drives the rotary comminuting member is supported on the frame at a point above the comminuting zone.
- 259** This subclass is indented under subclass 257.1. Devices in which the rotary comminuting member is adjustable to vary the contiguity of the relatively moving surfaces.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 256, for adjustable comminuting members mounted for rotation on a horizontal axis.
- 259.1** This subclass is indented under subclass 244. Apparatus provided with means to change the distance between the comminuting faces.
- (1) Note. Usually the purpose of this means is to vary the particle size of the product, or to compensate for wear of the surfaces.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 82.2, for means to vary particle coarseness in a helical pusher type comminutor.  
 230+, for an adjustable or yieldable mounting and a rotary cooperating surface.  
 259, for an adjustable rotary member.
- 259.2** Apparatus under 259.1 wherein the means to vary the distance between the surfaces includes hydraulic or pneumatic pressure.
- 259.3** This subclass is indented under subclass 259.1. Apparatus wherein the means to vary distance between the surfaces includes means to urge one surface toward or away from the other surface.
- 260** This subclass is indented under subclass 244. Devices in which one or both of the cooperating surfaces are not smooth but are provided with cooperating grooves, channels, protuberances or the like.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
 235+, and 242, for surfaces provided with cooperating nonsmooth characteristics in other types of comminutors.  
 291+, for single comminuting elements provided with nonsmooth surfaces.
- 260.1** This subclass is indented under subclass 260. Apparatus provided with a rotary helical comminuting member.
- (1) Note. The device herein is distinguished from those of subclass 247 in that the

worm is the only comminutor (other than the cooperating surface) in this subclass (260.1) whereas the device of subclass 247 is provided with an additional comminuting member, the worm or screw functioning as a feeder which may also comminute as it feeds.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

82.1+, for a helical pusher device provided with a comminuting surface having material discharge openings.  
243+, for an intermeshing cooperating nonsmooth surface.

**261** This subclass is indented under subclass 260. Devices in which the nonsmooth surface characteristics of the respective surfaces cooperate by intermeshing with or overlapping each other.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

188.1, for comminuting devices of a similar type provided with disk-like members having intermeshing impact pins.  
236, and 243, for intermeshing comminuting surface characteristics in other types of comminutors.

**261.1** This subclass is indented under subclass 260. Apparatus wherein one surface member is circular in a cross section taken perpendicular to the longitudinal axis and convergent in a cross section taken parallel to such axis.

**261.2** This subclass is indented under subclass 260. Apparatus provided with circular plates facing each other with their centers in alignment.

**261.3** This subclass is indented under subclass 261.2. Apparatus provided with ribs or channels which intersect each other, or which would intersect within the confines of the surface if extended.

**262** This subclass is indented under subclass 198.1. Apparatus in which at least one of the cooperating comminuting surfaces has a reciprocating motion, i.e., traverses the same path and reverses its motion at the ends of such path.

(1) Note. The path may be rectilinear or curvilinear.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

94, for reciprocating surfaces having openings.  
147+, and 164, for plural reciprocating type comminutors.  
169, for hand support type comminutors having this character of motion.  
201+, for compound movement comminutors in which the motion may have a reciprocating component.  
237, and 250, for devices in which a reciprocating surface cooperates with a rotary surface.  
283, for single surface type reciprocating comminutors.

SEE OR SEARCH CLASS:

60, Power Plants, appropriate subclasses, for fluid motor actuating means for reciprocating comminuting surfaces.  
74, Machine Element or Mechanism, appropriate subclasses, particularly subclasses 25+, for machine elements for actuating reciprocating comminuting surfaces.  
123, Internal-Combustion Engines, appropriate subclasses, for internal combustion motors for actuating reciprocating comminuting surfaces.  
452, Butchering, subclass 144, for meat tenderizers of similar construction.

**263** This subclass is indented under subclass 262. Apparatus in which the surfaces have reciprocating movement parallel to each other.

(1) Note. The surfaces may be held in sliding contact and may oscillate relative to a substantially concentric curved surface or have rectilinear motion relative to a flat surface.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

134, and 152.1+, for the combination of a plurality of such devices.



- 264** This subclass is indented under subclass 262. Apparatus in which the comminuting surface or surfaces have oscillating motion, i.e., the path of reciprocation through which the surface moves is a portion of a circle.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 94, for oscillating comminuting surfaces provided with openings.
- 148, and 164, for plural comminutors of this type.
- 263, for oscillating surfaces moving parallel to a cooperating surface.
- 283, for single surface type oscillating comminutors.

SEE OR SEARCH CLASS:

- 74, Machine Element or Mechanism, appropriate subclasses, particularly subclasses 25+, for oscillating surface actuating mechanisms, per se.

- 265** This subclass is indented under subclass 264. Apparatus provided with mechanism for primarily presenting material to the comminuting zone and/or removing it therefrom or for controlling the flow of material to and/or from the comminuting zone.

- (1) Note. The term "mechanism" is intended to denote means in addition to gravity for positively effecting the feed and/or discharge.
- (2) Note. The feeding and/or discharging must be an operation other than the mere comminuting movement of the comminuting surfaces. However, means for moving a comminuting member out of comminuting position for the specific purpose of discharging material was considered a discharging organization for this group.
- (3) Note. Material handling features in addition to those necessary to effect the mere presentation of the material to the comminuting zone or to remove the material from the comminutor were considered to be combined features which were more than mere feeding or discharging combi-

nations and were classified in subclasses 101.01+ unless provided for elsewhere.

- (4) Note. The various feeding and/or discharging subclasses of this class for feeders and/or dischargers in combination with other types of comminutors. Where no feeding and/or discharging group was provided, the patents were classified with the particular comminutor combination claimed.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 301, for feeders and/or dischargers combined with comminutors where the latter was claimed so broadly as to fail to present a basis for classification in a specific comminutor group.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, for feeders and dischargers involving the use of conveyors, per se.
- 222, Dispensing, appropriate subclasses for fluent material dispensers, per se.
- 414, Material or Article Handling, for the generic subject matter of material handling, per se.

- 266** This subclass is indented under subclass 264. Devices in which the oscillating surface cooperates with a surface which has movement during the comminuting operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 237, for related devices in which the surface which cooperates with the oscillating surface has a rotary motion. Since subclasses 220+, provide for surfaces having continuous rotary motion only, those devices providing an intermittently rotated surface cooperating with an oscillating surface have been classified in this subclass (266).

- 267** This subclass is indented under subclass 264. Devices in which the oscillating comminuting element is actuated about its pivot by an eccentric which imparts movement to a single link which has pivotal connection with the comminuting element.

**268** This subclass is indented under subclass 264. Devices in which the oscillating comminuting element is actuated about its pivot (1) by a plurality of serially arranged links which are pivoted together or are each pivoted to a common member or (2) by a single link which has movement imparted to it by a driven lever member.

- (1) Note. These types of actuators are those ordinarily known as “toggles”.

SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, subclasses 106 and 520, for actuating means of the specified type, per se.

**269** This subclass is indented under subclass 268. Apparatus in which there is provided means acting upon the pivotal connection between the plural serial links to impart movement to it and thus change the inclination of the links to oscillate the comminuting surface.

- (1) Note. In most of the patents included here, the pivot actuating means is an eccentric which drives a pitman member that is interposed between the adjacent ends of the links and forms the pivotal connection thereof.

**270** This subclass is indented under subclass 262. Apparatus in which the reciprocation of the comminuting surface is in a vertical straight-line path.

- (1) Note. Most of the devices classified in this group are those ordinarily known as “stamp mills”.

SEE OR SEARCH THIS CLASS, SUBCLASS:

149+, and 165, for plural devices of this type.

205, for devices having the characteristics of this group in which the reciprocating surface is given a rotary motion on the comminuting stroke.

263, for vertically reciprocating surfaces moving parallel to a cooperating surface.

SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, appropriate subclasses, for actuating devices of the type there provided for in which no claim is made to a significant comminutor combination. See the notes in the class definition.

81, Tools, subclasses 463+, and see the notes thereto for other impact tools.

91, Motors: Expansible Chamber Type, appropriate subclasses, for actuating devices of the type there provided for in which no claim is made to a significant comminutor combination. See the notes in the class definition.

100, Presses, subclasses 214+ for reciprocating presses not elsewhere provided for.

384, Bearings, for vertically reciprocating stems of stamp mills where no significant structure of the comminutor is included. See the line with Class 384 in the notes to the class definition.

418, Rotary Expansible Chamber Devices, appropriate subclasses, for rotary expansible chamber motors, per se, or in which no claim is made to a significant comminutor combination. See OPERATORS FOR COMMINTORS and References To Other Classes of the main class definition to this class (241).

**271** This subclass is indented under subclass 270. Apparatus provided with mechanism for primarily presenting material to the comminuting zone and/or removing it therefrom or for controlling the flow of material to and/or from the comminuting zone.

- (1) Note. The term “mechanism” is intended to denote means in addition to gravity for positively effecting the feed and/or discharge.

- (2) Note. The feeding and/or discharging must be an operation other than the mere comminuting movement of the comminuting surfaces. However, means for moving a comminuting member out of comminuting position for the specific purpose of discharging material was con-

sidered a discharging organization for this group.

- (3) Note. Material handling features in addition to those necessary to effect the mere presentation of the material to the comminuting zone or to remove the material from the comminutor were considered to be combined features which were more than mere feeding or discharging combinations and were classified in subclasses 101.01+ unless provided for elsewhere.

- (4) Note. The various feeding and/or discharging subclasses of this class for feeders and/or dischargers in combination with other types of comminutors. Where no feeding and/or discharging group was provided, the patents were classified with the particular comminutor combination claimed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 301, for feeders and/or dischargers combined with comminutors where the latter was claimed so broadly as to fail to present a basis for classification in a specific comminutor group.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, for feeders and dischargers involving the use of conveyors, per se.  
222, Dispensing, appropriate subclasses for fluent material dispensers, per se.  
414, Material or Article Handling, for the generic subject matter of material handling, per se.

- 272** This subclass is indented under subclass 270. Devices provided with means to rotate the reciprocating surface only upon its movement away from the cooperating surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 205, for comminutors in which the comminuting surface is both reciprocated and rotated during the comminuting operation.

SEE OR SEARCH CLASS:

- 74, Machine Element or Mechanism, appropriate subclasses, especially subclass 24, for actuators for imparting the above motion to a comminutor element.

- 273** This subclass is indented under subclass 270. Devices in which the vertically reciprocating surface is projected toward the cooperating surface solely by the force of gravity on the comminuting stroke.

- 273.1** This subclass is indented under the class definition. Apparatus having a surface provided with many closely spaced raised portions of a cutting tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 83+, for a comminuting surface with openings to permit discharge of material.  
274+, for a stationary comminuting surface or material bed having points or a sharp edged tool.  
277+, for a rotating comminuting surface having points or a sharp edged tool.  
283, for a reciprocating comminuting surface having points or a sharp edged tool.

- 273.2** This subclass is indented under subclass 273.1. Apparatus in which the comminuting surface is substantially planar and has a circular periphery.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 278.1, for a rotary radial surface not cooperating with another surface and not provided with barbs.

- 273.3** This subclass is indented under subclass 273.1. Apparatus wherein the work-engaging part of the tool is the surface traced by one side of a rectangle rotated around the parallel side as an axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 84.2, for a travelling roller-like surface cooperating with a surface having discharge passageways.

280+, for a rotating cylindrical surface in an apparatus provided with means to force material toward such surface.

**273.4** This subclass is indented under subclass 273.1. Apparatus wherein the closely-spaced raised portions are arranged on a nonplanar configuration.

SEE OR SEARCH THIS CLASS, SUBCLASS:

89.3, for a stationary concave surface provided with discharge openings.

**274** This subclass is indented under the class definition. Apparatus in which a single comminuting surface is stationary relative to the material presented to it for comminution and may comprise a bed of the material being comminuted.

SEE OR SEARCH THIS CLASS, SUBCLASS:

26, for corresponding processes involving the movement of material relative to a stationary material bed.

40, for devices in which fluid conveyed material is impacted upon a stationary abutment to effect comminution.

95, for identical devices in which the comminuting surface is provided with passages for the material.

136, for a plurality of such devices arranged for parallel or series parallel flow of material. Apparatus in which a plurality of distinct columns of material are fed against a common surface was considered to present a plurality of comminuting zones in parallel.

152.1+, for a plurality of such devices arranged for series flow of material therethrough.

198+, for devices in which material is presented to a stationary surface for comminution by a cooperating comminuting surface.

284, for mutual attrition and compression devices in which there is no disclosure of the moving material being presented to a stationary material bed for comminution.

SEE OR SEARCH CLASS:

83, Cutting, appropriate subclasses, for a cutting device having a stationary anvil, bed, or ledger blade.

99, Foods and Beverages: Apparatus, subclasses 506+ and 589 for static means separating a food item.

451, Abrading, subclasses 312+ for a sand-blast device in which the sand is projected by centrifugal force.

**275** This subclass is indented under subclass 274. Apparatus in which the centrifugal force generated by a material engaging rotating member projects or urges the material against the stationary surface or material bed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

5, for corresponding processes.

39+, for comminutors of this type utilizing a centrifugally generated stream of fluid to support and project the material against a surface.

SEE OR SEARCH CLASS:

99, Foods and Beverages: Apparatus, subclasses 519 and 571 for apparatus wherein separation of a food item is caused by impact which may be as a result of centrifugal force means.

124, Mechanical Guns and Projectors, subclasses 4+, for centrifugal object projectors of the type there provided for.

222, Dispensing, subclasses 410+, for rotary material dispensers.

239, Fluid Sprinkling, Spraying, and Diffusing, subclasses 7, 650+, appropriate subclasses, 214+ and 380+, for methods and apparatus for scattering fluent material by centrifugal force.

451, Abrading, subclasses 94+ for a sand-blast device in which the sand is projected by centrifugal force.

**276** This subclass is indented under subclass 274. Devices in which a conveyor engages the material to force it into comminuting contact with the stationary surface or bed of material.

(1) Note. The locomotive stoker type and the scroll type of crushers are included herein.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

284, for devices in which the comminution is effected by the mutual attrition or compression between particles of the material.

SEE OR SEARCH CLASS:

105, Railway Rolling Stock, subclasses 48.1 and 232+ for locomotive type stokers with comminuting means and significant railway vehicle structure.

110, Furnaces, particularly subclasses where means for distributing the fuel fed is claimed or where the relationship to or structure of a firebox is claimed. The mere reference to the firebox as the point of delivery (no structure thereof and no relationship thereto) will not cause classification in Class 110.

198, Conveyors: Power-Driven, appropriate subclasses, especially subclasses 657+, for conveying structures of general utility or for stokers combined with nominal railway vehicle structure.

**277** This subclass is indented under the class definition. Apparatus in which material is presented for comminution to a single comminuting surface which has a simple rotary motion.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

91+, for identical devices in which the comminuting surface is provided with passages for the material.

136, and 151, for plural devices of this type arranged for parallel or series-parallel flow of material. Apparatus in which a plurality of distinct columns of material are fed against a common surface was considered to present a plurality of comminuting zones in parallel.

152.1+, for plural devices of this type arranged for series flow of material.

185.5, through 197, for rotary comminuting devices provided with members which strike the material.

220+, for rotary surfaces which cooperate with other surfaces to effect comminution.

SEE OR SEARCH CLASS:

144, Woodworking, the various rotating tool subclasses, for similar devices for shaping wood.

451, Abrading, subclasses 177+ for an abrading device employing a rotating tool.

#### **278.1 Radial comminuting surface:**

This subclass is indented under subclass 277. Apparatus in which the rotary surface is generally normal to the axis of rotation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

92, for comminuting apparatus in which the comminuting surface is provided with a radial comminuting face having openings to permit discharge of material.

244+, for a comminuting device in which comminution is effected between the cooperating radial surfaces of rotary comminuting members

SEE OR SEARCH CLASS:

99, Foods and Beverages: Apparatus, subclasses 622 and 631+ for a rotating radial face food separating machine.

451, Abrading, subclasses 259+ for an abrading machine in which a rotary tool presents a radial face to the material.

#### **278.2 Internal comminuting surface:**

This subclass is indented under subclass 277. Apparatus in which the material is presented to a rotary comminuting surface that is generally curved about and faces the axis thereof.

(1) Note. The comminuting surface may comprise the inside of a rotary drum.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

91, for comminuting apparatus provided with a rotary comminuting surface having openings to permit discharge of material.

- 228, for comminuting apparatus in which material is comminuted between an internal comminuting surface and a cooperating rotary surface.
- SEE OR SEARCH CLASS:
- 451, Abrading, subclasses 259+ for an abrading machine in which a rotary tool presents an internal face to the material.
- 279** This subclass is indented under subclass 277. Apparatus in which the material is supported for presentation to the rotating comminuting surface by means which permits the rotation of the material about an axis within itself or which imparts a rotary motion to it.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 95, for means for supporting material for rotation relative to a stationary comminuting surface having passages for the material.
- SEE OR SEARCH CLASS:
- 144, Woodworking, appropriate lathe subclasses, for a similar device which provides for rotation of the work for shaping wood as opposed to comminution.
- 451, Abrading, the various "work rotating" subclasses, for similar relationships in abrading machines.
- 280** This subclass is indented under subclass 277. Apparatus provided with mechanism to carry the material up to and against the periphery of the comminuting surface.
- (1) Note. Most of the devices classified here are the abrading wood pulp type grinders.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 136, 151 and 152.1+, for plural devices provided with feed means of this type.
- 278.1, and the notes thereto for means for forcing material against a radial or internal surface.
- 279, for such devices having means to rotate material.
- 281** This subclass is indented under subclass 280. Apparatus in which the material forcing mechanism comprises means to engage a side or sides of the column of material being carried toward the comminuting surface.
- SEE OR SEARCH CLASS:
- 144, Woodworking, subclass 181.2 for a roller feed for a wood slicer.
- 198, Conveyors: Power-Driven, appropriate subclasses, for conveyors, per se, which engage the side or sides of a column of material.
- 282** This subclass is indented under subclass 280. Devices in which the material forcing mechanism comprises a reciprocating follower which is generally radially arranged relative to the rotating surface.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 136, for interconnected means for operating a plurality of reciprocating followers as defined above.
- SEE OR SEARCH CLASS:
- 222, Dispensing, subclasses 386+, for containers provided with followers to dispense material therefrom.
- 451, Abrading, subclasses 212+ for a reciprocating work feeder for a rotary abrading tool.
- 282.1** This subclass is indented under subclass 277. Apparatus provided with a knife or blade-like comminuting element.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 292.1, for similar devices not involving rotation.
- 282.2** This subclass is indented under subclass 282.1. Apparatus wherein the member is removably fastened to a revolving support.
- 283** This subclass is indented under the class definition. Apparatus in which material is presented to a single comminuting surface which has a reciprocating motion relative to the material.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 94, for identical devices in which the comminuting surfaces are provided with passages for the material.
- 136, and 151, for a plurality of such devices arranged for parallel or series parallel material flow therethrough. Apparatus in which a plurality of distinct columns of material are fed against a common surface was considered to present a plurality of comminuting zones in parallel.
- 152.1+, for a plurality of such devices in series.
- 205, 237, 250, and 262+, for devices having surfaces which reciprocate relative to a cooperating surface.

SEE OR SEARCH CLASS:

- 30, Cutlery, subclasses 136+, for hand manipulated scrapers adapted to be reciprocated over the surface of material.
- 83, Cutting, appropriate subclasses, for a cutting device provided with a reciprocating tool.
- 144, Woodworking, appropriate reciprocating cutter subclasses for a device for cutting wood or a similar material.
- 451, Abrading, subclasses 162+ for an abrading machine having reciprocating tools.

- 284** This subclass is indented under the class definition. Apparatus in which (1) portions of the material are caused to move relatively with respect to other portions to effect comminution by attrition, or (2) portions of the material are subjected to pressure against other portions thereof, or (3) the material is subjected to the combined action of both attrition and compression.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 26, for corresponding processes.
- 39, for attrition devices in which the material is suspended in a fluid.
- 91, for rotary screen receptacles for tumbling material to comminute it by attrition.

- 170+, for attrition devices employing loose grinding bodies.
- 276, for devices in which a conveyor forces material against a stationary surface or material bed to effect the comminution.

SEE OR SEARCH CLASS:

- 100, Presses, appropriate subclasses for presses not elsewhere provided for, and see especially subclasses 104+ for presses having drain means for expressed liquids.
- 451, Abrading, subclasses 32+ and 326+ for a process or apparatus for abrading articles by mutual attrition.

**285.1 Comminutor mounting means, frame or other normally stationary structure:**

This subclass is indented under the class definition. Apparatus in which the claims are limited to the means for supporting the comminutor, the stationary frame parts of the comminutor, and other parts combined therewith which are adapted to remain stationary during the normal operation of the device and are not provided for above.

- (1) Note. See COMMUNOTOR OR COMMUNOTOR ELEMENT SUPPORT AND MOUNTING MEANS and Lines With Other Classes of the class definition of this class for notes to related art and for a statement of the lines followed with other classes as to supports, frames, etc.
- (2) Note. The combination of a frame with a normally stationary comminuting element is included here unless the particular combination is provided for above. Where a moving comminuting element is significantly included, classification is proper in a subclass above which provides for the moving comminuting element. Combinations limited to a comminuting element and its immediate supporting structure, where no reference to significant frame structure is included, are classified below as elements in subclasses 291+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 46.014+, for a garbage disposal housing.

- 65+, for a frame or other stationary comminutor part provided with means (e.g., a heating jacket) to change the temperature of the material.
- 83+, for a frame for mounting a comminuting element having openings.
- 226, for a frame having attached means for retaining material on a rotary surface.
- SEE OR SEARCH CLASS:
- 52, Static Structures (e.g., Buildings), subclasses 27+ for a residual building structure combined with an article or article support and subclasses 648.1+ for a three-dimensional openwork frame, tower, etc.
- 248, Supports, subclasses 637+ for a machinery support of general application.
- 384, Bearings, subclasses 428+ for a support for a bearing.
- 285.2 Removable or displaceable housing section:**  
This subclass is indented under subclass 285.1. Apparatus including a portion for encasing the comminuting structure which is intended to (a) be readily detached from the remainder thereof or (b) be repositioned relative to the remainder thereof.
- 285.3 Pivoted housing section:**  
This subclass is indented under subclass 285.2. Apparatus including a portion for encasing the comminuting structure which is intended to be repositioned relative to the remainder thereof by movement about an axis.
- 286** This subclass is indented under subclass 285.1. Apparatus in which the frame members are provided with means to adjustably or yieldably mount the normally stationary comminuting element.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 32, for means mounting comminuting elements for release upon overload.
- 37, for automatically controlled means for adjusting the distance between cooperating comminuting surfaces.
- 46.014+, for the housing of a sink mounted garbage disposal.
- 239+, for comminutors in which a nonrotary surface is mounted so as to be adjustable or yieldable relative to a significantly claimed cooperating rotary surface.
- 287** This subclass is indented under subclass 286. Apparatus in which the stationary comminuting element is pivotally connected to the frame structure.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 89, for pivotally mounted perforated comminuting elements which cooperate with a rotary striking member.
- 239, for pivotally mounted comminuting elements in combination with a cooperating rotary surface.
- 288** This subclass is indented under subclass 287. Apparatus in which the comminuting element is so pivoted to the frame, usually by a universal mounting or its equivalent, as to be capable of assuming and maintaining a number of different positions, i.e., by self-adjusting relative to the moving surface.
- SEE OR SEARCH CLASS:
- 464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, appropriate subclasses, particularly subclasses 107+ for a coupling which accommodates relative displacements between a millstone and a vertically oriented shaft.
- 289** This subclass is indented under subclass 287. Apparatus in which the normally stationary member is mounted to yield about the pivotal connection as an axis upon the application of an abnormal force.
- (1) Note. The mounting must be such as will return the comminuting element to its original position upon cessation of the abnormal force.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 32, for overload release devices for supporting comminuting elements for yielding movement but which are not adapted to return the element to its original position upon cessation of the force.



- 290, for yieldingly mounted comminuting elements mounted otherwise than upon a pivot.
- 290** This subclass is indented under subclass 286. Apparatus in which the normally stationary comminuting element is so connected to the frame as to be capable of yielding movement upon the application of abnormal force.
- (1) Note. The mounting must be such as will return the comminuting element to its original position upon the cessation of the abnormal force.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 32, for overload release devices for supporting comminuting elements for yielding movement but which are not adapted to return the element to its original position upon cessation of the force.
- 289, for pivotally mounted yielding comminuting elements.
- 291** This subclass is indented under the class definition. Apparatus comprising single comminuting elements not provided for above.
- (1) Note. Supporting means for the element in combination therewith has been included in this group except where such means locates the element relative to the frame of the machine or the other comminuting elements.
- (2) Note. In all cases where a plurality of cooperating comminuting elements are claimed significantly or the driving means of a moving element was included, the device was considered to be a comminuting organization and was classified as such and excluded from this group.
- (3) Note. See COMMUNOTOR OR COMMUNOTOR ELEMENT SUPPORTS AND MOUNTING MEANS and Lines With Other Classes, References to Other Classes of the class definition of this class for notes to art in other classes relating to supports or shaft couplings for comminutor elements.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 66+, for comminuting elements provided with means to modify the temperature thereof.
- 83+, for comminuting elements having openings therein to permit the discharge of material.
- 102, for comminuting elements deformable by contact with the material.
- 179+, 184, 191+, and 195+, for comminuting elements which are considered restricted in use to particular organizations and classified therewith.
- 235+, 242+ and 260+, for comminuting elements having nonsmooth surface characteristics where such elements are claimed significantly in combination with cooperating elements.
- SEE OR SEARCH CLASS:
- 106, Compositions: Coating or Plastic, Note particularly the class definitions for the classification of other compositions.
- 175, Boring or Penetrating the Earth, subclasses 327+ for an earth boring bit or bit element.
- 299, Mining or In Situ Disintegration of Hard Material, subclasses 79.1+ for a cutter head or tooth for recovering valuable material or breaking up hard material in situ.
- 420, Alloys or Metallic Compositions, for patents having claims to comminuting elements claimed solely in terms of their metal or alloy composition, whether or not the alloy is claimed, per se.
- 451, Abrading, subclasses 540+ for similar elements which abrade the material.
- 292** This subclass is indented under subclass 291. Comminuting elements provided with means attached thereto to adjust or alter the distribution of weight about the axis of the elements.
- SEE OR SEARCH CLASS:
- 73, Measuring and Testing, subclasses 66+, for machines for testing rotor unbalance.

- 74, Machine Element or Mechanism, subclass 573.1 for flywheel provided with fluid balancing means.
- 464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, appropriate subclasses, particularly subclasses 107+ for coupling which accommodates displacement between a millstone and a vertically oriented shaft.
- 292.1** This subclass is indented under subclass 291. Apparatus wherein the comminutor is a knife-like element which is perpendicular to an axis of rotation.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
282.1+, for similar devices in a rotary comminutor.
- 293** This subclass is indented under subclass 291. Comminuting elements having a generally cylindrical or frusto-conical shape and which present a peripheral comminuting surface.
- (1) Note. See the notes to subclass 291, for such elements classified elsewhere in this class on the basis of special or combined characteristics, and see the notes to the definition of subclass 221, for references to other classes employing rolls in organizations which change the dimensions of the material or its particle size.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
235+, 242+ and 260+, for such elements having nonsmooth surface characteristics in cooperation with other comminuting elements.
- SEE OR SEARCH CLASS:  
19, Textiles: Fiber Preparation, subclass 54, for textile gin rollers.  
100, Presses, subclasses 155+ for roll type conveying presses not elsewhere classified, and see especially subclass 176 for roll pairs.  
451, Abrading, subclasses 541+ for cylindrical abrading elements.  
492, Roll or Roller, for a roll, per se, not elsewhere provided for, and see the notes thereunder.
- 294** This subclass is indented under subclass 293. Comminuting elements provided with comminuting surfaces formed in a plurality of sections or embodying separable surface elements.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
93, for cylindrical comminuting elements having apertures with means for securing cutting blades thereto.  
191, for rotors having striking members having the defined characteristics.  
298, for sectional disk-like comminuting elements.
- 295** This subclass is indented under subclass 294. Comminuting elements in which the sections are generally annular.
- (1) Note. The cleavage planes between the sections are usually normal to the axis but may be in the form of a helix or set at an angle to the normal plane so long as the sections are generally annular.
- 296** This subclass is indented under subclass 291. Comminuting elements which have comminuting surfaces in the general shape of a disk on a radial face.
- (1) Note. Most of the patents classified in this subclass are concerned with the surface characteristics of the disk, i.e., the millstone "dress".
- (2) Note. See the notes to subclass 291 for such elements classified elsewhere in the class on the basis of special or combined characteristics.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
260+, for such elements having nonsmooth surface characteristics arranged in cooperative relationship with another element.
- SEE OR SEARCH CLASS:  
99, Foods and Beverages: Apparatus, subclasses 622 and 631+ for rotating radial face food separating means particularly subclass 633 for an irregularly shaped radial face.

- 100, Presses, subclasses 155+ for roll type conveying presses not elsewhere classified, and see especially subclass 176 for roll pairs.
- 144, Woodworking, subclass 176, for a wood slicing disk.
- 403, Joints and Connections, subclasses 230+ for a joint between a hub or plate-like member and shaft.
- 451, Abrading, subclasses 508 through 520, and 548+, for an abrading tool in the form of a disk.
- 460, Crop Threshing or Separating, subclass 47, for disks used in corn shellers.
- 464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, appropriate subclasses, particularly subclasses 107+ for a coupling which accommodates displacement between a millstone and a vertically oriented shaft.
- 297** This subclass is indented under subclass 296. Comminuting elements provided with comminuting faces on both sides.
- (1) Note. The plural faces of the elements may either be adapted for alternative use (reversible) or for simultaneous use.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 146, for organizations embodying such elements in which the plural faces are adapted for simultaneous use.
- 298** This subclass is indented under subclass 296. Comminuting elements in which the comminuting face is made up of sections or parts, at least one of which is prefabricated, which are subsequently assembled to form the comminuting surface.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 92, for disk-like comminuting elements having apertures therein provided with prefabricated assembled sections of parts.
- SEE OR SEARCH CLASS:
- 403, Joints and Connections, appropriate subclasses for joints and connections of general utility.
- 299** This subclass is indented under subclass 291. Comminuting elements comprising annular structures which present an internal comminuting surface.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 66+, for such elements provided with temperature modifying means.
- 83+, for such elements provided with openings for the passage of comminuted material.
- 102, for such elements provided with a surface deformable by contact with the material.
- 179+, for receptacle structure including internal comminuting surface features.
- 228, for such elements combined with a cooperating rotary member.
- 260+, for such elements having nonsmooth surface characteristics arranged in cooperative relationship with another element.
- 278.1, for such elements combined with means to present to the internal face the material to be comminuted.
- 300** This subclass is indented under subclass 291. Comminuting elements in which the wear face or a section thereof is provided with means to attach it to a backing member.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 197, for rotary striking members having attached wear members.
- 294+, for sectional or separable surface elements adapted to form a wear face for, and be attached to, cylindrical or frusto-conical elements.
- 298, for wear face sections to be applied to disk-like comminuting elements.
- SEE OR SEARCH CLASS:
- 403, Joints and Connections, appropriate subclasses for joints and connections of general utility.

**300.1** This subclass is indented under subclass 291. Apparatus wherein the comminuting elements are thin, knife-like members; some lie evenly in a plane and others lie unevenly in such plane.

**301** This subclass is indented under the class definition. Apparatus not hereinbefore provided for.

- (1) Note. For example, in this subclass will be found miscellaneous types of comminutors not hereinbefore provided for and combinations of feeders with comminutors in which the latter is not claimed with such particularity as to form a basis of classification in a preceding subclass.

#### CROSS-REFERENCE ART COLLECTIONS

The following subclasses are collections of disclosures pertaining to various aspects of the comminuting art which aspects do not form appropriate bases for subclasses in the foregoing classification (i.e., subclasses superior hereto in the schedule), wherein original copies of patents are placed on basis of proximate function of the apparatus. These subclasses assist a search based on remote function of the apparatus and may be of further assistance to the searcher, either as a starting point in searching this class or as an indication of further related fields of search inside or outside the class. Thus, there is here provided a second access for retrieval of a limited number of types of disclosures.

- (1) Note. Disclosures are placed in these subclasses for their value as references and as leads to appropriate main or secondary fields of search, without regard to their original classification or their claimed subject matter.
- (2) Note. The disclosure found in the following subclasses are examples only of the indicated subject matter, and in no instance do they represent the entire extent of the prior art.

**600** Apparatus which comminutes fuel and is provided with means to deliver the product to a combustion chamber.

SEE OR SEARCH THIS CLASS, SUBCLASS:

101.5, and other appropriate subclasses involving material handling.

SEE OR SEARCH CLASS:

110, Furnaces, subclass 232 for a refuse incinerator or solid fuel furnace provided with comminuting means.

126, Stoves and Furnaces, for the combination of a fuel comminutor and a furnace or stove.

**601** Apparatus which are used to disintegrate lumpy sand or other hard material, usually as a reconditioning treatment of previously used material.

**602** Apparatus which comminutes and dispenses soap.

SEE OR SEARCH CLASS:

221, Article Dispensing, and 222, Dispensing appropriate subclasses, for soap dispensers not provided with a comminutor.

**603 Animal powered mill:**

Apparatus in which power is derived from an animal to drive a comminutor.

**604 Plural inlets for diverse materials:**

Apparatus in which plural inputs are adapted to feed material of diverse characteristics to a comminutor.

**605 Hay unbaler:**

Apparatus specifically designed to break apart tightly bundled hay.

**606 Medical/surgical waste comminution:**

Apparatus designed to comminute material or a device used in a medical or surgical procedure, generally intended for further disposal.

END